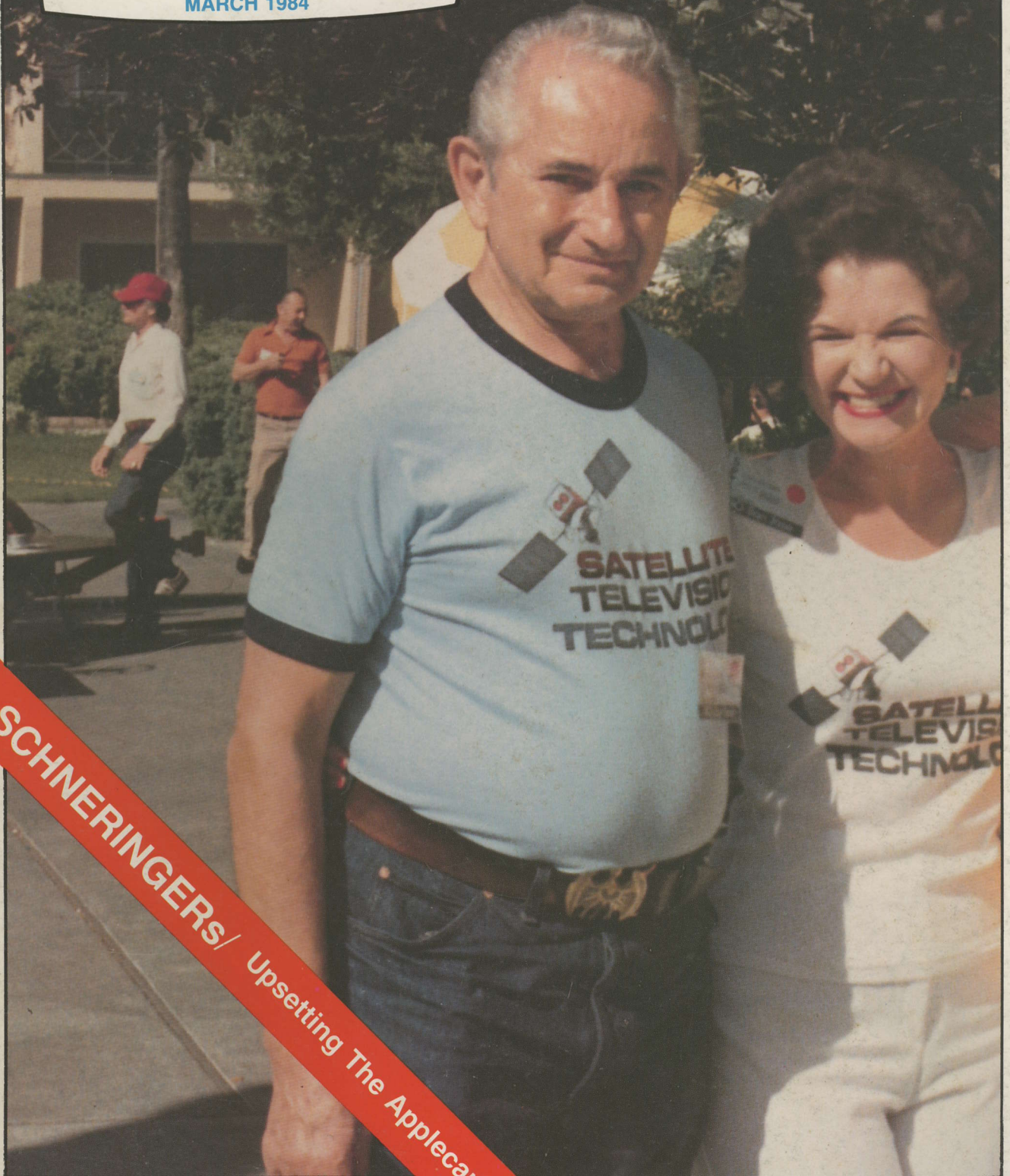


**COOP'S
SATELLITE
DIGEST**



MARCH 1984



THE SCHNERINGERS/ Upsetting The Applecart



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TOP OF THE MONTH

EQUIPMENT TESTS. As we approach the March 'Show Of Shows' month, there is a backlog of new equipment sent to the Providenciales test range to review this month. The USS (Maspro) SR-2 receiver, a new 13 foot 'domestic dish package' from Hero Communications and a novel dish drive and controller system from Draco head the list.

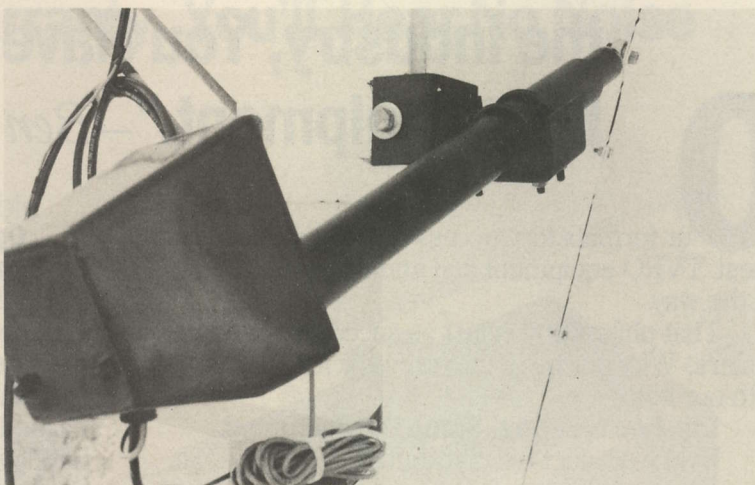
GALAXY 1 TESTS are beginning to look more and more like cable programmers could be involved in a massive 'insurance scheme' to cover their F3R bets. Rumors about problems with F3R operations have started, possibly without foundation although past problems with other RCA birds suggests we take a hard look. Coop Comments this month.

TVRO FEEDS gets its fourth and we hope final treatment, for now, as the feed giants battle for position in the marketplace. We rate all feeds tested and look at the product from Omni Spectra here, this month.

MOST OF US will be in Las Vegas, sometime between the 18th and 22nd of March. The future of STTI, and the future of the trade association's part in trade shows is on the line in this almost surrealistic intra-industry squabble. **CSD** will be at both and we hope to see you either on the floor, in the lot, or at the 'booth.' Come by and find out about **CSD/2** while you are there! Coop Comments, naturally, this month.

MARCH 1984

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OUR COVER/ Norval M. (Rick) Schneringer and Gloria Schneringer; right in the middle of an industry rhubarb that threatens to dismember the industry's trade association and strip it back to 'ground zero.' The Schneringer's **STTI** firm meets **SPACE** head-on in Las Vegas this month, as both groups offer competing trade shows during the March 18-22 'show week.' Coop Comments, page 4.

COOP'S SATELLITE DIGEST



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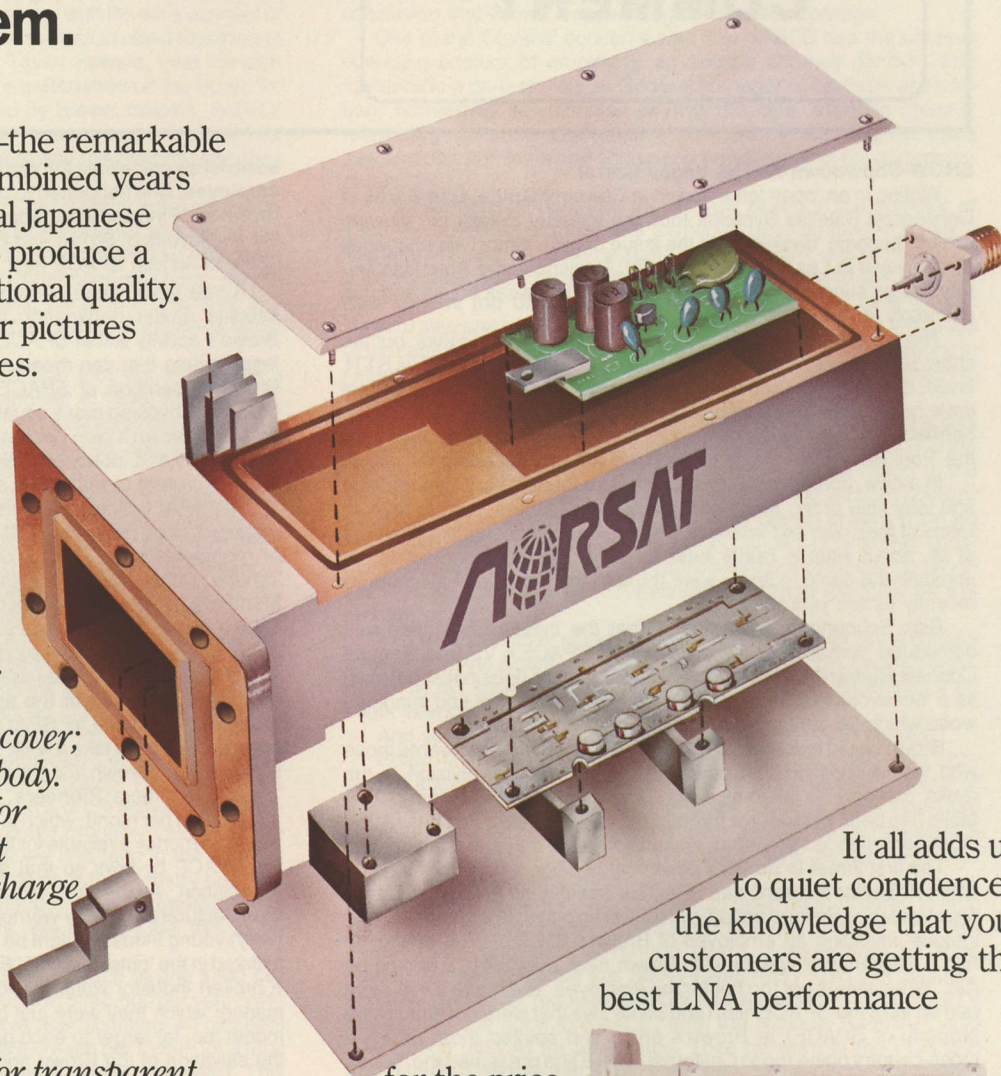
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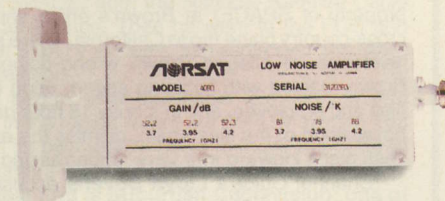


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COOP'S SATELLITE COMMENT

- SHOW-Showdown
At The 'Las Vegas Corral'
- IS F3R Having Problems?

SHOW-Showdown At The Vegas Corral

Writing in an 'open letter' forum in **Channel Guide**, **Dan Berge** of Continental Satellite Systems took the industry to task for allowing itself to become 'divided' over the issue of twin, almost simultaneous trade shows in Las Vegas this month. Reciting some American history, Berge suggested that a divided house is a weak house and that ultimately 'it would fall.'

The issue before the industry IS division within the ranks, but the show 'issue' is a symptom, not a cause. This is not a 'SPACE vs STTI' issue; it is far bigger and much more complicated than that. The real issue here is 'who is in charge of the industry?'. Ultimately, STTI's **Rick Schneringer**, now widely painted as a villain, may be remembered as the 'Paul Revere' who rode through the industry sounding the alarm.

In a new, upstart industry such as ours there is very little tradition and very little order. Many of the so-called 'leaders' tend to think in terms of their own self-interests first, their egos second, and finally, if at all, about what is **really best** for all of the industry. This is not unusual; the cable industry went through the same identity crisis as recently as ten years ago.

Rick Schneringer's position is that the industry is largely run, dominated perhaps, by the presence of SPACE's VP and General Counsel **Richard L. 'Rick' Brown**. Schneringer does not see Brown as a 'benevolent dictator' and recites a long list of real and imagined woes which he attributes to Brown's position of power.

Brown would hardly deny his is a powerful position but warns those who would question that power that open warfare, division in the ranks, can only be taken as a sign of weakness by 'the enemy.' This tactic has been persuasive through the SPACE years and has for the most part silenced any open dissension from within the ranks.

The first threat to Brown's power came early. It was back in 1980 when **H. Taylor Howard** was SPACE's first elected President. Late in his presidency Howard became an unwilling player in a game of 'office intrigue' involving an employee of Brown's law firm. The employee had a difference of opinion with Brown over 'how SPACE should be run.' When things got too hot for the employee, she made a mid-night raid on all of the SPACE files (and some files that were not directly the property of SPACE) at Brown's office and spirited them off on a cross-country plane trip to California. There she presented the files as 'evidence' of alleged Brown wrong-doings to President Howard. Brown reacted with lightning speed, upon discovery of the missing files and employee, and in a busy 18 hour day managed to gain legal possession of the files again, dismiss the employee, and in the process place Howard in a very embarrassing position.

Channel Guide's **Lloyd Covens** accused Brown of holding the industry 'hostage' in a much read and often para-phrased editorial this past fall. Covens found out just how much power Brown wields within the industry when a major portion of it came down on him with both feet following publication of the editorial. Covens, it appeared, would think twice before striking out at Brown again; a subject we shall return to.

Schneringer claims that Brown has a power-base that extends over the full industry. Schneringer further suggests that the 'depth and calculated use of that power base is a cancer eating away at the industry's maturity.' The basis for Schneringer's claims is the way that SPACE itself is structured.

The SPACE Board of Directors ostensibly formulates policy and

establishes guidelines for 'staff.' The 'staff' consisted of **one full time employee**, who happened to be housed in the Washington law firm of Brown and Finn and who happened to be indistinguishable from any of the employees of Brown and Finn who share the same office facility. There is no real SPACE staff; a subject we shall also return to.

A free lance writer of some fame, writing in the **David Wolford** satellite dealer publication this past December, suggested that Brown's activity within SPACE amounted to '**conflict of interest**'; a legal phrase that can mean several things. The article alleged that Brown's operation of SPACE, as General Counsel, and de-facto bossman, involved many situations where SPACE direction was governed by Brown's own personal (business) interests and not necessarily by SPACE policy established by an elected Board of Directors. We shall return to that topic, also.

The SPACE Board consists of nearly two-dozen people. They are manufacturers, distributors, SMATV operators, dealers and 'consumer representatives.' Control of the Board rests with none of these 'groups'; rather, control is in the hands of something called '**Pioneer Members**.' A pioneer member is any firm, or individual, willing to lay \$300 a month on the line as a membership fee. There are presently approximately 40 such 'pioneers' and they account for around \$12,000 per month in trade association revenues. **Pioneer control of the board occurred in the spring of 1981.** This was one of those 'crossroad' junctions for SPACE; broke, unable to pay its bills, it was given a 'pay up or I take a walk' ultimatum by Counsel Brown. Negotiations between Brown and the then-paying members resulted in a new 'class' of members; **Pioneers**. The pioneers agreed to fund SPACE at a fixed level per month which in turn assured Brown and firm that there would be money available for their legal bills. Brown, in turn, fashioned the SPACE by-laws so that the 'pioneers' would control the trade association. At the time pioneers were almost entirely equipment manufacturers and they worried that without a trade association their (very) young industry might be broken apart by legislation or lawsuits initiated in the 'outside world.' Faced with this possibility, they saw that a broken industry would no longer be able to support them in the manner which they were just becoming accustomed to. The \$300 a month fee, far larger to each participant in 1981 than it is today, was the salvation of the Brown and SPACE 'marriage.'

And so, we had the second 'threat' to Brown's power. An unhappy employee fleeing to President Howard as a refugee in 1980; a broke and ailing bank account in 1981. Brown saw both through to victory.

The rationale presented to the world for 'Pioneer Member' control of SPACE in 1981 was simply this; **those who pay, play**. The pioneers were paying the bills, so the pioneers would be responsible for running the trade association. That was before the trade association attempted to broaden its base of operations. This happened, again, because Brown made a move.

In the summer of 1982, Brown attempted to divide SPACE into three or perhaps four separate trade associations. Brown felt there was great wisdom and strong arguments for making SPACE a 'master trade association' with various distinct, self-governing sub-associations below the master group. Brown saw a master group made up of big-money folks; those whom he perceived would be willing to pay **several times \$300 a month** in return for being elected to sit on the Board of the umbrella **control group**. Below this upper

echelon he saw separate groups for dealers, SMATV operators and individual TVRO owners (i.e. consumers). At the root of his plan was money; he believed that since the industry had handled the \$300 a month pioneer dues with such ease, there was probably a core group willing to spend far more per month if the need could be shown. To 'sell' the concept to the then-board, he relied on the arguments that dealers were not getting a fair share of SPACE interest, that consumers were not getting a fair share of SPACE interest, and that SMATV was going to be a big deal; if SPACE didn't put in an 'SMATV division' some other 'upstart group' was going to move in as 'competition.' **The idea almost sold**, but the Board was uneasy with Brown's concept of four distinct and separate Boards of Directors, all in effect reporting to him. A group within the Board, led by Taylor Howard, beat the plan down. As a substitute, a few seats were established on the Board for each of the three categories suggested by Brown; dealers, SMATV and consumers. When the smoke had cleared and the board had been 're-apportioned,' the pioneers were still the majority and they were still in control.

Rick Schneringer claims that Brown's motivations in the not entirely successful attempt to create four separate Boards was monetary. Schneringer paints Brown as a cash-driven entrepreneur **who happens to practice law**. Brown's plan, Schneringer maintains, was to separate 'the men from the boys,' raising the ante for the men and sending the boys to the minor leagues where they could practice being men.

The 'defeat' of the Brown divisional plan may not have been a defeat after all. Brown would, by the summer of 1983, have accomplished pretty much the same thing with his latest law-marketing-plan; 'The Super Fund.' That is a subject we shall also return to.

Let us return to numbers once again.

If we today have approximately \$12,000 per month being mailed into the SPACE coffers by 'Pioneers,' what about the dealer members? How much do **they** contribute to SPACE per month or per year?

Membership rosters are confidential, as they should be. Financial statements are not public. In fact, at Board meetings they are passed around for inspection **and then collected by Brown and Finn** so that no member of the Board leaves the room with financial statements. Ostensibly, the statements are monitored by the **elected treasurer** of the trade association. In actual fact, they are prepared by a Washington accounting firm using numbers handed to it by Brown and Finn. The treasurer does nothing more than 'attest' to the figures.

Let us make an assumption, nonetheless. Let us assume that SPACE has various levels of dealer participation. David Wolford's publication suggests that **no more than 20%** of the active dealer base in the industry supports SPACE. We could probably calculate how many dealers that would amount to, if we had faith in the Wolford percentage, and, we knew how many dealers the industry has. We have no such faith and no such knowledge. So **our assumption** is that SPACE has 500 dealer members. We clearly label this as an assumption.

Five hundred dealer members of SPACE, each paying **\$300 per year** to SPACE to be in that 'club,' amounts to \$150,000 per year. With that number in mind, recall that we have approximately 40 pioneers contributing approximately \$144,000 (\$300 each per month for a total of \$12,000 per month; 12 months equals \$144,000 per year). This says that if our assumption is correct, or low, that **the dealer members** are presently contributing **as much to the SPACE gross annual income** per year as the all powerful pioneers, who presently 'control' the Board of Directors.

Schneringer has done this same math and he feels that the dealers, whom he characterizes as 'the little people who make this industry work so well,' are getting a very sharp point on a very short stick.

The pioneer control of the board is of course a hold over from the spring of '81 crisis where Brown gave the then-Board an ultimatum; cough up regular, big bucks or he would quit representing SPACE. Since **he** was writing the by-laws, **he saw to it** that in return for their much needed support, they as a group would control the trade association. **Some people see this as a conflict of interest.**

That the pioneers dominate the board by sheer numbers, that the dealers make up but a tiny fraction of the board while apparently contributing as many annual membership dues-dollars as the pioneers, seems 'in conflict' and 'wrong' to many.

If there was a Brown 'Marketing Plan' for the pioneer program, it has never been seen in public. Clearly at the 1981 crisis meeting held in Chicago, he was hopeful of landing at least 20 'pioneer members.' By 1983, the combined income from pioneers, dealers, and others (consumers and SMATV) was characterized as 'inadequate to meet the growing legal needs of the industry.' It would be in the **fall** of 1983 that publisher Lloyd Covens of Channel Guide would carry this rationale to his own logical conclusions, and he would conclude that Brown was **demanding more and more money** from the industry in return for bigger and bigger legal bills. Covens, as noted, came to the conclusion that Brown was 'holding the industry hostage.'

One of the Covens' concerns was that SPACE has the unusual operating posture of employing an outside attorney (Brown) who functions in a de-facto role as General Manager of the trade association, **collecting** the income, **paying** the bills, **signing** checks, **managing** the trade association's publications, **running** the trade association's seminars and shows and **handling** all of the correspondence.

This same issue bothered the SPACE Board in the summer of 1983. A committee of three was formed to develop guidelines for a 'General Manager,' and some staff. Taylor Howard, one of the trio on the committee, took the assignment a step further; **he found a candidate for the job of General Manager**. Brown didn't care for this Howard step and a quiet but formidable impasse developed. Progress of the committee ground to a halt, and at the SPACE Board meeting in Orlando this past November, the original three man committee resigned and a new committee was formed.

Brown had his own ideas about hiring a staff. His concept was that rather than one 'strong General Manager' who would report to the Board directly, he wanted a pair of people who would report to the officers. Brown is an officer. Brown made it clear **he** was not going to be answering to an employee of SPACE or **taking orders from an employee**. The program has drifted along since that time with spasmodic attempts to 'advertise job available' announcements, largely in the Washington, DC area. Schneringer has some thoughts on this process as well.

'Brown would never stand for a General Manager who had either a direct link to the Board, or, who could develop his own power base. Brown **MUST** have a power base, **which he totally controls**, or he might lose control over the money.'

And some would see **that** as a possible 'conflict of interest.'

Board Member **Peter Sutro** of Patmar Technologies was concerned about another potential conflict of interest last fall. As one of the SMATV representatives on the Board, and as a businessman working and residing in the State of New Jersey, Sutro had special knowledge about the attempt by the state of New Jersey to regulate SMATV systems in that state.

An SMATV system in New Jersey had been court-ordered to stop construction on a private system located on private property. The New Jersey cable television governing board, administered by state bureaucrats, had decided that SMATV was really 'CATV in disguise' and they wanted to 'regulate' SMATV as well as CATV. The SMATV builder had first gone to SPACE, and, the National Satellite Cable Association (NSCA) for assistance. Then he went to the FCC and asked the FCC to rule that SMATV systems, like cable systems, were exempted from state regulation.

The whole incident began when the cable television system franchisee and operator, in the region where the SMATV system was under construction, used its own legal muscle to incite the State of New Jersey. Sutro and others looked into this aspect of the case.

'The name of the cable firm is Suburban Cablevision; one of the ten largest single-system operators in the United States. Suburban Cablevision and its parent corporation, a Canadian cable system owner, had legal counsel in Washington, DC. That legal counsel was Brown and Finn ...'

That Brown and Finn has clients outside of SPACE is no secret. That Brown and Finn have clients in the CATV business is no secret. That Brown and Finn might one day end up with a conflict between two opposing clients was inevitable.

However, when SPACE prepared and filed its own comments to

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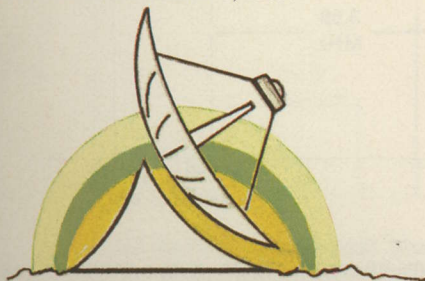
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Part 2: SMATV HEADENDS

ALL Signals Not Created Equal

In our look at the SMATV headend in the February CSD, we were concerned that our modulator-channel products would be compatible with one another, and that as we added channels together (called 'combining') we would not create inter-action between channels on the cable distribution plant. This month we will look at the unique problems presented by local, 'off-air,' television signals, and deal with the complex problems that come up when we are attempting to 'mix' both off-air signals and modulator-created signals into a single cable 'trunk.'

To understand how problems arise, you first must have a fundamental grasp of how the television spectrum is 'laid out,' and, how the average television receiver reacts when you present it with a multitude of television channels; **one after the other on the dial.**

Channels are grouped, one after another (i.e. **adjacent**) as follows:

- A) Channels 2, 3, 4
- B) Channels 5, 6
- C) Channels 7, 8, 9, 10, 11, 12, 13.

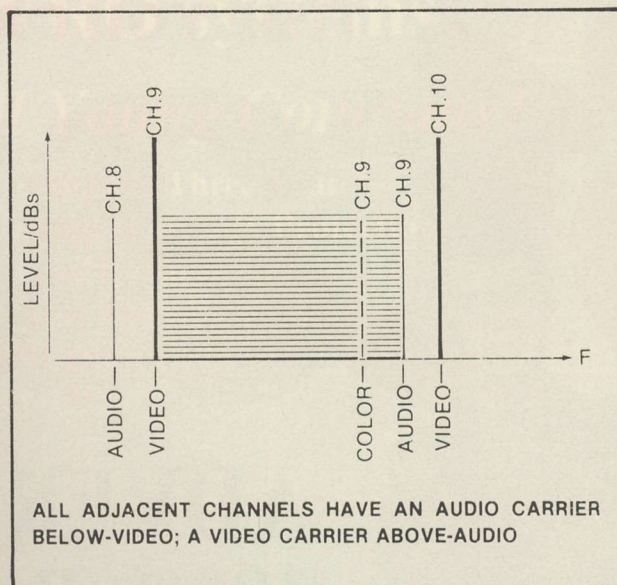
We will make reference here to 'upper adjacent channel' and 'lower adjacent channel.' That works out this way.

Channel	Upper Adjacent	Lower Adjacent
2	3	none
3	4	2
4	none	3
5	6	none
6	none (FM band)	5
7	8	none
8	9	7
9	10	8
10	11	9
11	12	10
12	13	11
13	none	12

The television receiver functions by tuning in the desired channel (such as 3) and then shifting the frequency of that channel (sound and picture) to an 'IF' in the 41/45 MHz region. The IF stages of the TV set are just like the 70 MHz (IF) segment of your TVRO receiver; they provide selectivity, to separate out a **single channel at a time**, so that the demodulated signal containing audio and video is 'clean' of any interference from adjacent channels.

The 'selectivity' of the TV set's IF is not very great. When the television set sees channel 3 in the IF, it will also see **part** of the channel 2 information and **part** of the channel 4 information at the same time. The TV set IF is where a considerable amount of 'signal gain' takes place, just as with your 70 MHz IF in your TVRO receiver.

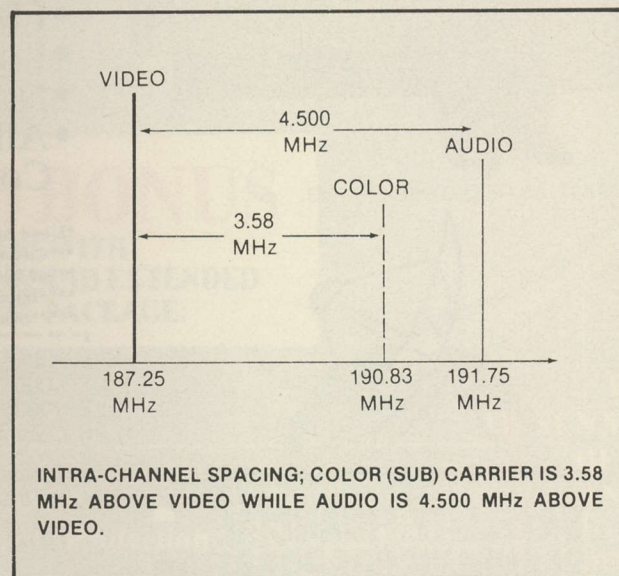
As the diagram here shows, all channels which are adjacent on one or both sides to other channels have an **audio carrier just below** the desired channel video (i.e. channel 2 audio is appearing just below the channel 3 visual carrier) and a **video carrier just above** the desired channel audio (i.e. channel 4 video just above channel 3 audio).



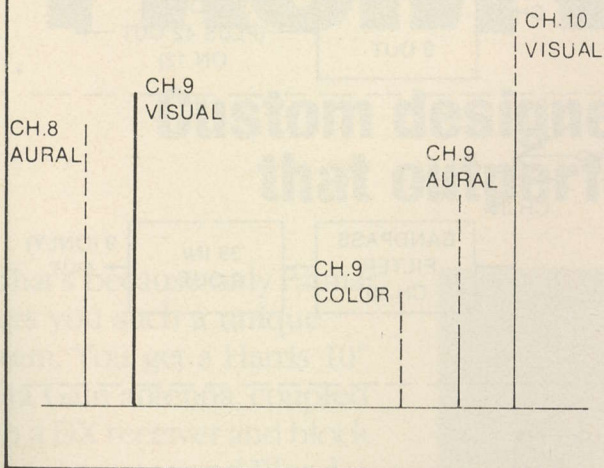
Within the channel, inside of that 6 MHz bandwidth that a TV channel occupies with the NTSC television system, the channel is sub-divided as shown in **diagram form here**:

- A) The video carrier is on the lower side of the channel, actually 1.25 MHz 'up' from the bottom of the channel proper (i.e. channel 9 is assigned to 186-192 MHz and the video carrier falls at 187.25 MHz).
- B) Precisely 3.58 (give or take a few thousand parts) is a color 'subcarrier.' In our channel 9 example, this places the color subcarrier at 190.83 MHz.
- C) Then, 4.5(00) MHz above the video carrier is the sound carrier. We are now at the 'top' of the channel assignment (186-192) and we are only .25 MHz away from the lower boundary for channel 10 (192 MHz).

The **sound carrier** from the lower adjacent channel (8 in our example) will therefore be **1.5 MHz below** the visual carrier for **channel 9**; while the visual carrier for the upper adjacent channel (10 in our example) will be 1.5 MHz above the aural carrier for channel 9. These are relatively close spacings, and this is a cause of considerable problems when you attempt to stack one channel after another on a cable system. You are asking the individual television receivers to properly tune-in the desired channel, and, to reject or ignore the



TOO HIGH AURALS WILL "CRAWL" INTO UPPER ADJACENT VIDEO. TOO HIGH VIDEOS WILL "CRAWL" INTO LOWER AUDIO.



immediately adjacent channels on **each side**.

Television sets were never designed, originally, to operate with immediately adjacent channels. The FCC, wisely, in establishing the 'channel allocations' pattern did not assign **adjacent channels to the same city** or 'market.' The allocations were geographically alternated so that each successive market used 'the other' set of channels. An example:

- A) New York City is allocated channels 2, 4, 5, 7, 9, 11 and 13;
- B) Philadelphia/(Lancaster)/(Wilmington) are allocated channels 3, 6, 8, 10 and 12.

Between the two markets, we have all 12 VHF channels in use. But none are in use on an adjacent-channel basis within a single market.

If the FCC and TV set designers never intended for there to be 'adjacent channel operation,' how do cable systems get away with it?

The trick is to very-very carefully maintain almost exactly equal or even signal strength levels on all adjacent channels going to a cable connected TV set. If a TV set receives +6 dBmV on channel 3, it must also receive the same signal level (± 3 dB) on channels 2 and 4. The TV set **will separate** adjacent channels, **provided** the signal levels are 'balanced' channel to channel. This is something cable can do; it is not something that individual home antennas can do.

When the cable system does not do this, we have two possible

types of interference. The channel 8 carrier, **in our example**, if too strong in relation to the channel 9 visual carrier, will place a cross hatch or pattern over the top of channel 9's picture. There is a proper 'minimum-level-difference,' as we shall see, to be maintained between the lower adjacent audio, and the desired channel visual carriers.

If the channel 10 visual carrier is too strong, then we will have scratching sounds and 'cross talk' from the channel 10 video onto the weaker channel 9 audio carrier. Again, there is a proper ratio or relationship to maintain between true adjacent channel carriers.

We have already established that there should be a 'leveling' between true adjacent channels; at each set connected to the system. And that within ± 3 dB (or less), we must insure that the adjacent channels stay even with one another.

We also have one other consideration; the ratio or difference between the desired channel video carrier, **and its own sound carrier**. The generally accepted practice is to adjust the desired channel audio carrier so that it is 15 dB weaker (generally written -15 dB) than the desired channel visual carrier. If we follow this practice, then our example becomes:

- 1) Channel 8 audio/ -15 dB reference channel 9 visual carrier;
- 2) Channel 9 visual/ +15 dB reference channel 8 aural carrier;
- 3) Channel 9 aural carrier/ -15 dB reference channel 9 visual carrier;
- 4) Channel 10 visual carrier/ +15 dB reference channel 9 aural carrier.

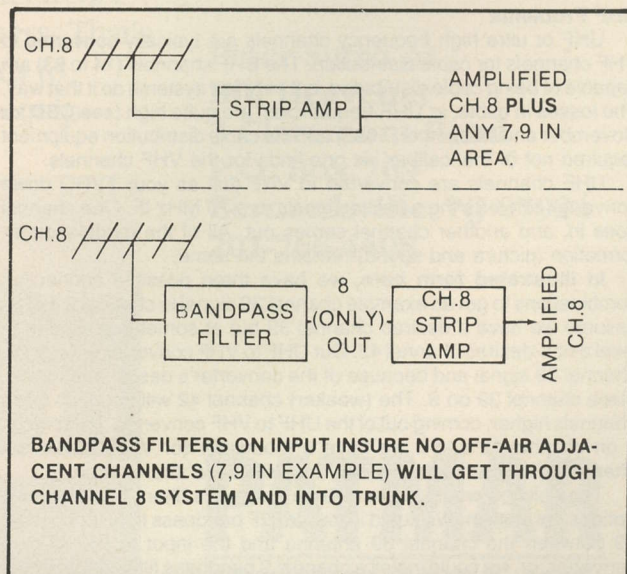
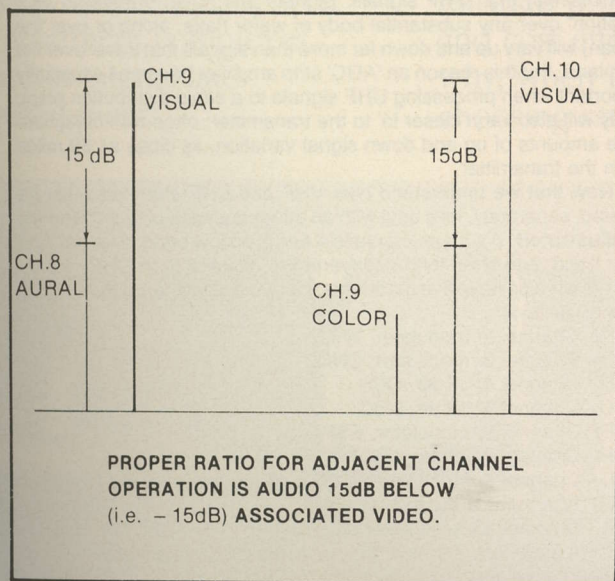
Those are the basic rules of placing channels into an adjacent-channel environment on any cable system.

OFF Air Signals

In an SMATV system, we will be typically taking one or more satellite delivered signals, through an in-house modulator, and mixing the satellite/modulator signals with locally available off-air (VHF or UHF) channels. The net result will be a mixture of several possible services.

Let us assume for illustration that we will have channels 7 and 9 in our system occupied by modulator signals; and channel 8 occupied by an off-air signal. The off-air channel 8, for our first example, is relatively close by and all that we require is to install a channel 8 (single channel) antenna, running coaxial cable to a single channel 'strip' amplifier.

A **strip amplifier** is sort of like an 'IF'; it is designed to amplify a single channel. However, because we have the adjacent channels so close in frequency, if there happens to be any measurable amount of channel 7 or 9 in the same area (even if very weak), the channel 8 strip amplifier would also amplify these carriers as well; in particular, the channel 7 audio and the channel 9 picture.



If we intend to use channels 7 and 9 for on-cable distribution of **modulator signals**, we do not want any 'other' channel 7 or 9 signals in our cable system. Given that the channel 8 'strip amp' is not totally selective, we need some way to insure that only channel 8 goes through the strip amp and into the system.

The solution to that is a unit called a 'bandpass filter'; a highly selective device that traps out (gets rid of, attenuates) any possible channel 7 or 9 signal(s) coming through the channel 8 system. **That is shown here in diagram form.** Note that we have installed the bandpass filter between the channel 8 antenna and the channel 8 strip amp. It could also go after the channel 8 strip amp, but the usual practice is to place it in front of the strip amp to avoid allowing channel 7 and 9 signals into the strip amp at all.

If our off-air signals are not local (i.e. within 50 miles or less), we can expect them to vary in signal strength from hour to hour and day to day. In fact, even signals from a few miles away will vary in level as the weather between you and the transmitter changes. However, we can usually cope with relatively modest changes in signal level as we shall see.

A 'distant' off-air channel requires either a bigger receiving antenna (such as 'stacked yagi antennas'), and/or its own signal pre-amplifier. The pre-amplifier is like the LNA; it mounts typically at the antenna proper, boosting the signal before there is signal degradation (attenuation) caused by the loss of the coaxial cable between the antenna and the strip amplifier/processing equipment.

Most of the modern strip amplifier packages either have 'AGC' (automatic gain control) as a standard feature, or it is available as an option. AGC is very important with a strip amplifier operating on any channel that is subject to signal level variations, since unless there is a method to **control the output signal leaving the strip amplifier**, we will have picture levels going up and down on the cable system as a function of the input signal level variations. Remember that our adjacent channel cable system will work, with a standard TV set, provided we maintain constant and even signal levels on adjacent channels. A channel 8 signal that goes down 10 dB in the daytime and comes up 10 dB at night is going to drive channels 7 and 9 crazy on the cable. So we must 'AGC' or control the channel 8 signal, in the processing or strip amplifier equipment. Most strip amplifiers with AGC will control a signal that fades up and down through a 20 dB region and maintain the output to the system within ± 1 dB. However, not all signals fade in the same manner. Some signals may fade 'down' 5 dB in the worst average case, **but up 15 dB** when the weather is just right. This means you have to adjust the 'AGC window' of the strip amplifier so that rather than sitting in the **middle** (i.e. capable of controlling signals that fade **down 10 dB and up 10 dB**), the AGC window is 'offset' to control signals that fade down 5 and up 15. Instructions with most strip amplifiers tell you how to do this; usually strip amp controls and/or external pad units.

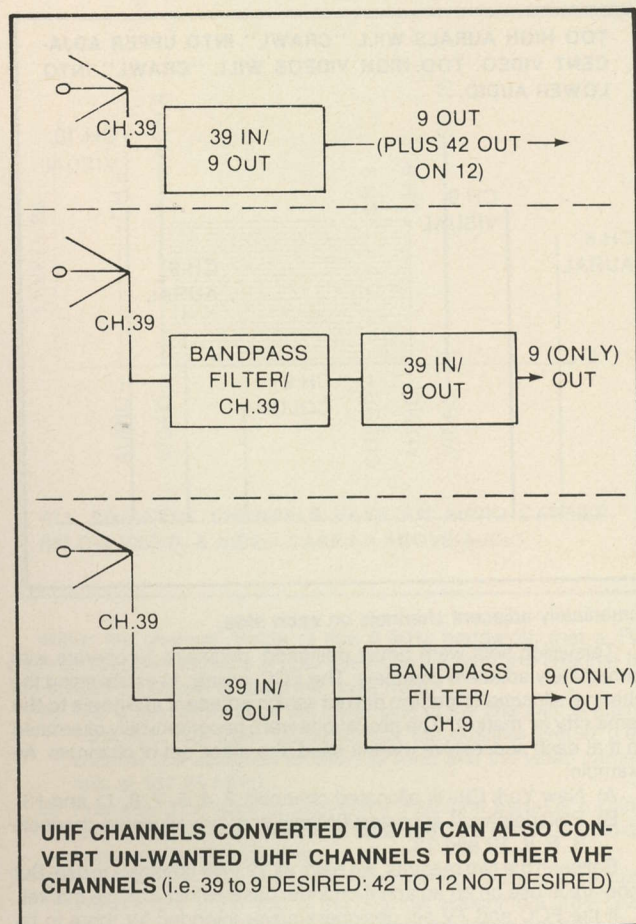
UHF Problems

UHF or ultra high frequency channels are typically converted to VHF channels for cable distribution. The UHF channels (14 to 83) are capable of being cable distributed, but very few systems do it that way. The losses in cable, at UHF frequencies, are quite high (see **CSD** for November and December, 1983) and the cable distribution equipment required not of the 'caliber' as one finds for the VHF channels.

UHF channels are converted to VHF just as your TVRO down converter converts the satellite signals to a 70 MHz IF. One channel goes in, and another channel comes out. All of the modulation information (picture and sound) remains the same.

In illustrated form here, we have three possible connection combinations to get an example channel 39 signal to channel 9. Let us assume we have a desired channel 39 but at something weaker in level a non-desired channel 42. Our UHF to VHF converter will see the channel 39 signal and because of the converter's design and tuning, place channel 39 on 9. The (weaker) channel 42 will show up three channels higher, coming out of the UHF to VHF converter. That places it on channel 12 and if we have a modulator (or VHF) station on channel 12 in our cable system, this will cause interference.

The solution would seem to be a bandpass filter. There are two options, **as shown**. We could install a UHF bandpass filter for channel 39 between the channel 39 antenna and the input to the 39 to 9 converter, or, we could install a channel 9 bandpass filter at the output



of the 39 to 9 converter. Which is best?

It turns out that you always get better stability, and better selectivity, if you keep your 'filtering' at the lowest possible frequency. This is why we have our filters in a TVRO receiver at 70 MHz rather than some much higher (gig-a-hertz) frequency. So this says that the best choice is to select a **channel 9 bandpass filter** and install it **after** the 39 to 9 converter, ahead of a strip amplifier for channel 9.

UHF signals are subject to a higher degree of signal fading (up and down levels) than VHF signals. Signals that have to travel to your location over any substantial body of water (lake, along or over the ocean) will vary up and down far more than signals that travel over flat farmland. For this reason an 'AGC' strip amplifier becomes especially important when processing UHF signals to a cable distribution plant. They will also vary 'closer in' to the transmitter; often with objectionable amounts of up and down signal variation, as close as 30 miles from the transmitter.

Now that we understand how VHF and UHF channels must be treated, separately, let's deal with an off-air package of four channels, **as illustrated**. We have channels 4 and 5 on low band, channel 7 on high band, and channel 39 converted to channel 9 on UHF.

We will also have five modulator channels. Our channel line-up will look as follows:

- A) Channel 2/ modulator, WGN
- B) Channel 3/ modulator, CNN2
- C) Channel 4/ off air, CBS
- D) Channel 5/ off air, NBC
- E) Channel 6/ modulator, ESPN
- F) Channel 7/ off air, ABC
- G) Channel 9/ 39 converted to 9, off air, independent
- H) Channel 11/ modulator, CBN
- I) Channel 13/ modulator, WTBS

We'll deal here, for now, only with the off-air channels.

Channels 4 and 5 have separate single channel yagi antennas. No

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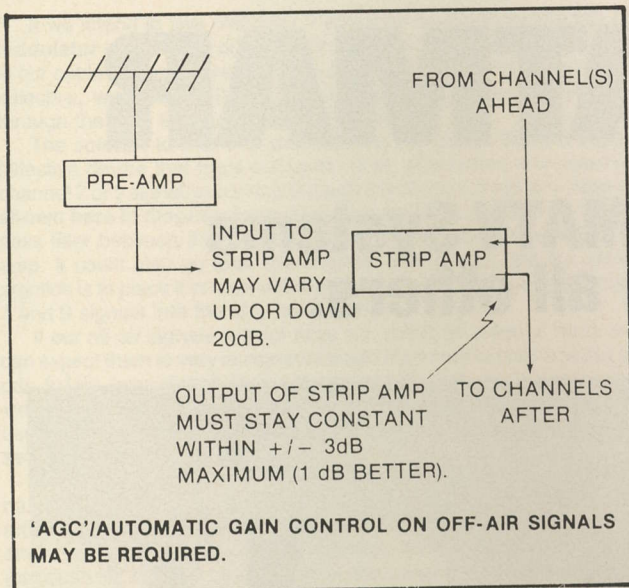
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pre-amplifiers are required because of the strength of the signals. The signals go through coaxial cable (typically RG-59/U or RG-6/U) to a bandpass filter, and then to the respective single channel strip amplifiers.

Channel 7 is some distance so we have a signal pre-amplifier at the antenna, the signal then goes through low loss coaxial cable (RG-6/U or RG-11/U or .412 aluminum cable) to the indoor power supply that runs the pre-amplifier. Then there is a short jumper of RG-59/U cable which interconnects to the input of a bandpass filter. Finally there is the channel 7 single channel strip amplifier.

Channel 39 is close enough that no pre-amplifier is required. The signal goes into a single channel UHF to VHF (crystal controlled) converter which places it on channel 9. The channel 9 signal now loops through a channel 9 bandpass filter (only required if other UHF

channels might go through the converter and channel 9 strip to cause interference with other cable channels), and finally through a strip amplifier on channel 9.

FILTERING Of Modulators

We have seen how bandpass filters are essential parts of an off-air processing system if we wish to insure that each 'single channel processing package' is, indeed, only a single channel at the output. How do bandpass filters fit into our modulator channels?

There are, generally speaking, three 'levels' of modulators available.

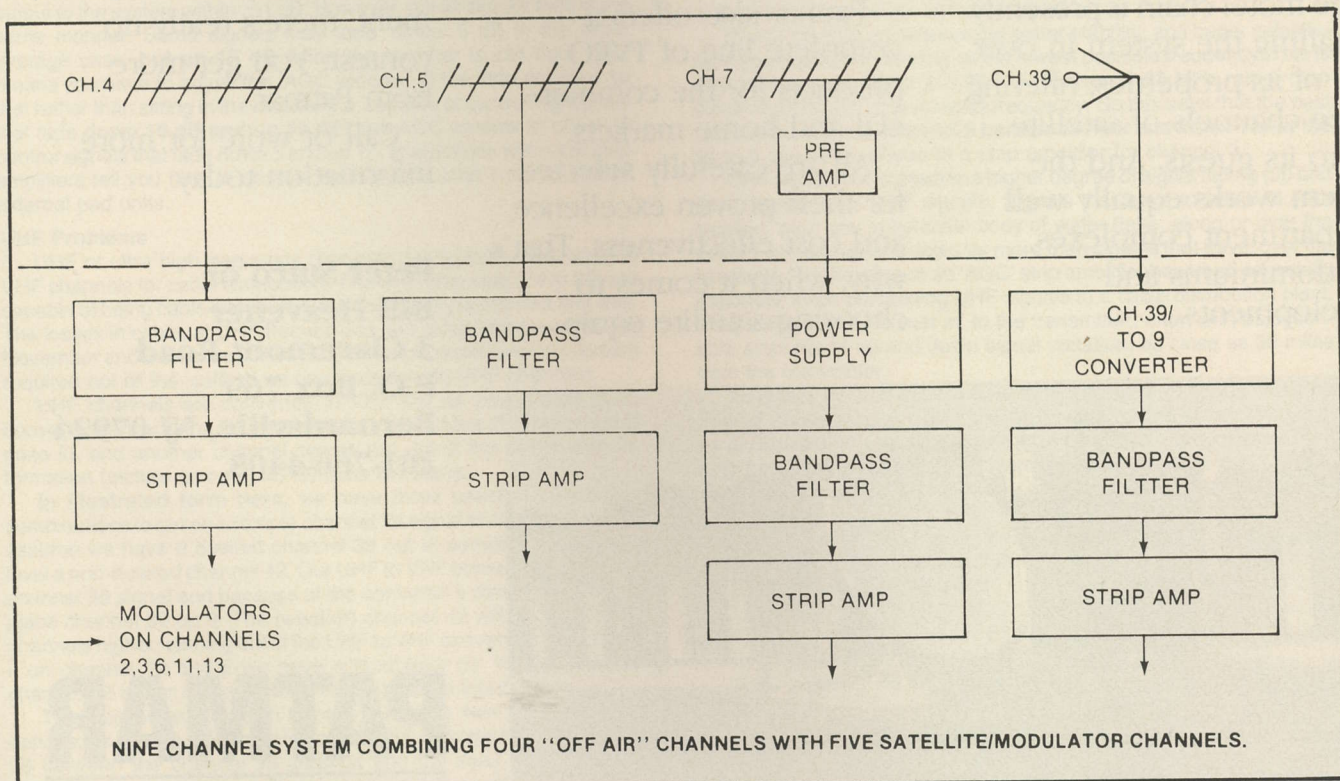
- Level One/** the 'home style' modulator, typically operating on channels 3 or 4 (although some models are adjustable over other VHF or even some UHF channels as well);
- Level Two/** single channel modulators, designed for MATV system use, usually crystal controlled on a single channel (see CSD for February, Part One of this series);
- Level Three/** single channel modulators, always crystal controlled, designed for CATV use.

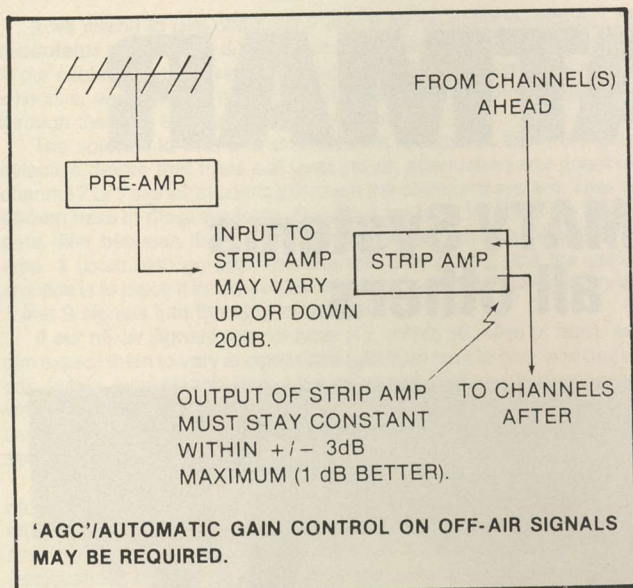
Level one modulators have two strikes against them for SMATV system use:

- They have **low output power capability**, typically less than +10 dBmV which happens to be about the right amount of power for a single TV set (or two) but not enough for use with multiple sets in a cable system.
- They often send out a signal which has **two sidebands** present; an upper sideband **and** a lower sideband. **You need and want** the upper sideband (the part that falls in the channel from the visual carrier upward, higher in frequency; **see diagram** on page 8 here). You do not want the lower sideband since it falls down below the carrier frequency, into the next lower (adjacent) channel.

Level two modulators are permissible for SMATV use **provided** you do not use them with any lower adjacent channels. They typically do have sufficient signal output (although not as much as the CATV versions), but they also typically do not have a 'filtered' lower adjacent channel.

This means that you could use them on channels 2, possibly 5, and 7 in a 12 channel system; or any other channel provided you were **not**





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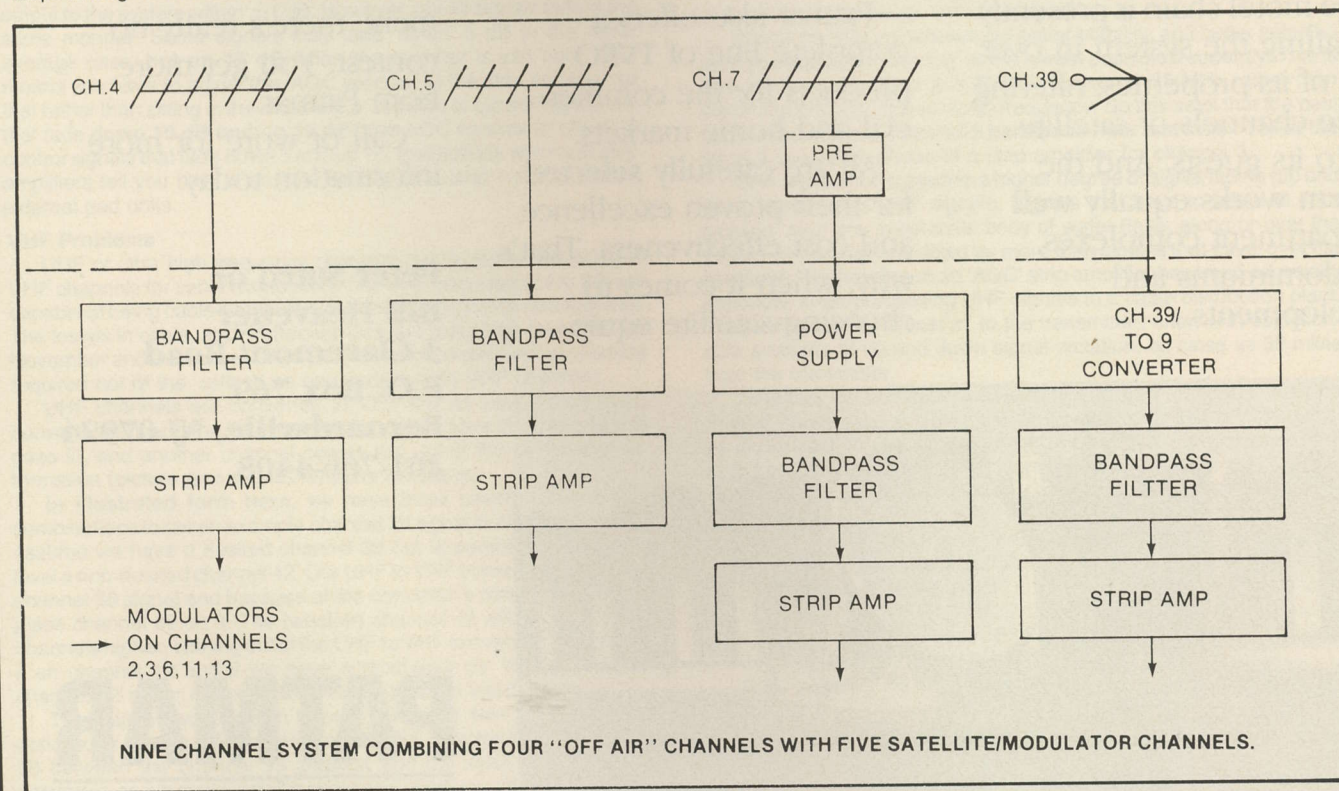
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This means that you could use them on channels 2, possibly 5, and 7 in a 12 channel system; or any other channel provided you were **not**



using the channel immediately lower (i.e. use it on channel 3 when channel 2 will be vacant).

Or, you could use this type of modulator **and** you could install a **bandpass filter** after the modulator. The bandpass filter will take out the unwanted lower sideband signal, and that will eliminate the 'double sideband modulator' causing interference with the lower adjacent channel.

You find out what type of modulator is being offered you by asking these two questions:

- 1) "**Does this modulator have a lower vestigial sideband filter**?" That means does it filter out the lower adjacent channel information. If the guy responds, "huhhh?", you know he is not up on his modulators. Proceed to the next question.
- 2) "**Does the manufacturer recommend using this modulator with true adjacent channel operation; can I use it on channels 2 and 3 and not have the channel 3 modulator cause interference with the channel 2 signal**?" He should understand that one, or the data sheet should tell you.

Level three modulators have built-in 'lower vestigial sideband filters.' That means they are, indeed, designed to operate in adjacent channel configuration. You can stack them up all day long, and combine them from one to another in a prescribed manner, as we shall see.

(Part one of this series, appearing in the February CSD, looked into modulator designs and how you operate them in an SMATV environment. A subsequent segment of this series will look at several modulator products now available with our critique of each.)

COMBINING Channels

Now we have two separate types of signals in our system; we have off-air signals which we have processed with the appropriate filters and strip amplifiers and other required equipment, and we have our modulator source channels from satellite. How do we get them all together into a single piece of (trunk line) cable?

Let's look first at a simple system, using just low band channels 2, 3, 4, 5 and 6. We have off-air signals on channels 3 and 5, modulator channels on 2, 4 and 6. We have elected to use a level of modulator (Level Two) which does require a bandpass filter after the modulator. We are also placing bandpass filters after our two off-air channel strip amps; channels 3 and 5. Why **after** the strip amps?

There is no hard and fast rule that tells us we **MUST** place all strip amp bandpass filters ahead of the strip amps. Here is what is involved.

If we have possible off air signals on channels 2 and 4 which **might** get into the channel 3 strip amp system, we would like to filter them out so they do not interfere with our channel 2 and 4 modulator source signals. **We can place the filter ahead of the strip amp and do this; or we can place the filter after the strip amp and do the same thing.** The net result is precisely the same. The filter will attenuate (reduce) the level of the channel 2 and 4 signals the same amount in either position.

We also have the probability that regardless of whether there are any carrier signals on channels 2 and 4 that might bother us, we are

going to have a modest but measurable amount of 'noise' coming out of the strip amp's innards on channels 2 and 4. Noise is a form of interference, and we can eliminate or greatly reduce it if we simply place a strip amp bandpass filter **after** the strip amp. In other words, even without adjacent channel 2 and 4 signals, we can always get a cleaner signal through a strip amp if we follow it with a (high quality) bandpass filter. So by placing it after the strip amp, on channels 3 and 5 in our example, we have cured two potential problems; whereas, if we placed it ahead of the strip amp, we would cure only one potential problem.

Most strip amplifiers have something called 'loop through.' We'll see what that is all about, shortly. Loop through does not work, however, as a 'tool' for the headend wiring technician if he has a bandpass filter **after** the strip amp. Strips 'loop'; bandpass filters typically do not 'loop.'

To combine our five channels, we have to 'mix' them together in a precise manner. We have the following rules of thumb:

- 1) We never connect two immediately adjacent channels together at the same time;
- 2) We combine in 'steps' or stages to insure that we do not cause interference between the channels we are combining into an eventual single output line or cable.

In our example low band (2-6) system, **we have an illustration of how this is done.** The mixing or combining 'tools' are 'hybrid splitters.' We normally think of a signal splitter as a device that takes the signal source and divides it up into two or more separate output lines. The same device also works fine in reverse; you plug the signal sources into the output, **and then the single input becomes the output!** The word 'hybrid' is important since this describes a particular type of divider; one which allows you to use it in this type of application. When in doubt, ask to see the specification sheet. A non-hybrid splitter will not function properly in this application (and it is a bad choice for normal splitting applications as well).

Channels 2, 4 and 6 are individually connected to the three **outputs** of a three-way hybrid splitter. Channels 3 and 5 are individually connected to the two **outputs** on a two-way hybrid splitter. Now we have to get these two sets of signals together; this requires a second two-way hybrid splitter to combine the 2/4/6 and 3/5 lines to a **single line.**

Many of the modulators and all of the strip amps you will run into typically have 'loop through' capability. That essentially means that you can, in a proper sequence, connect up the various channels by looping a set of cables from one modulator or strip amp to another modulator or strip amp. This eliminates **some** of the external hybrid units.

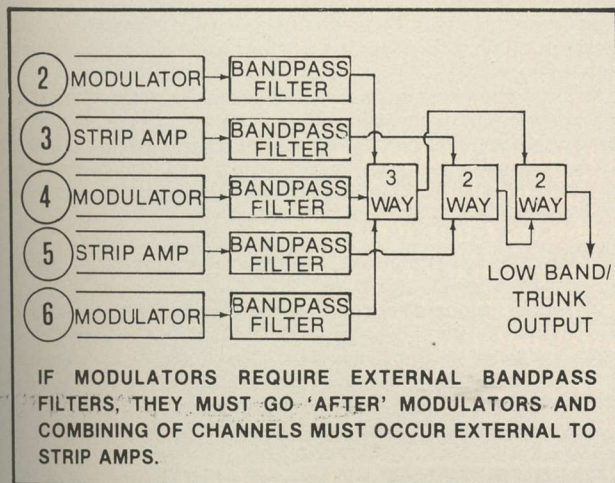
See the '**Master Combining**' example **here**; using channels 2, 3, 4, 5, 6 plus 7, 9, 11 and 13. We have strip amps on 4, 5, 7 and 9; the balance are modulators, as in an earlier example.

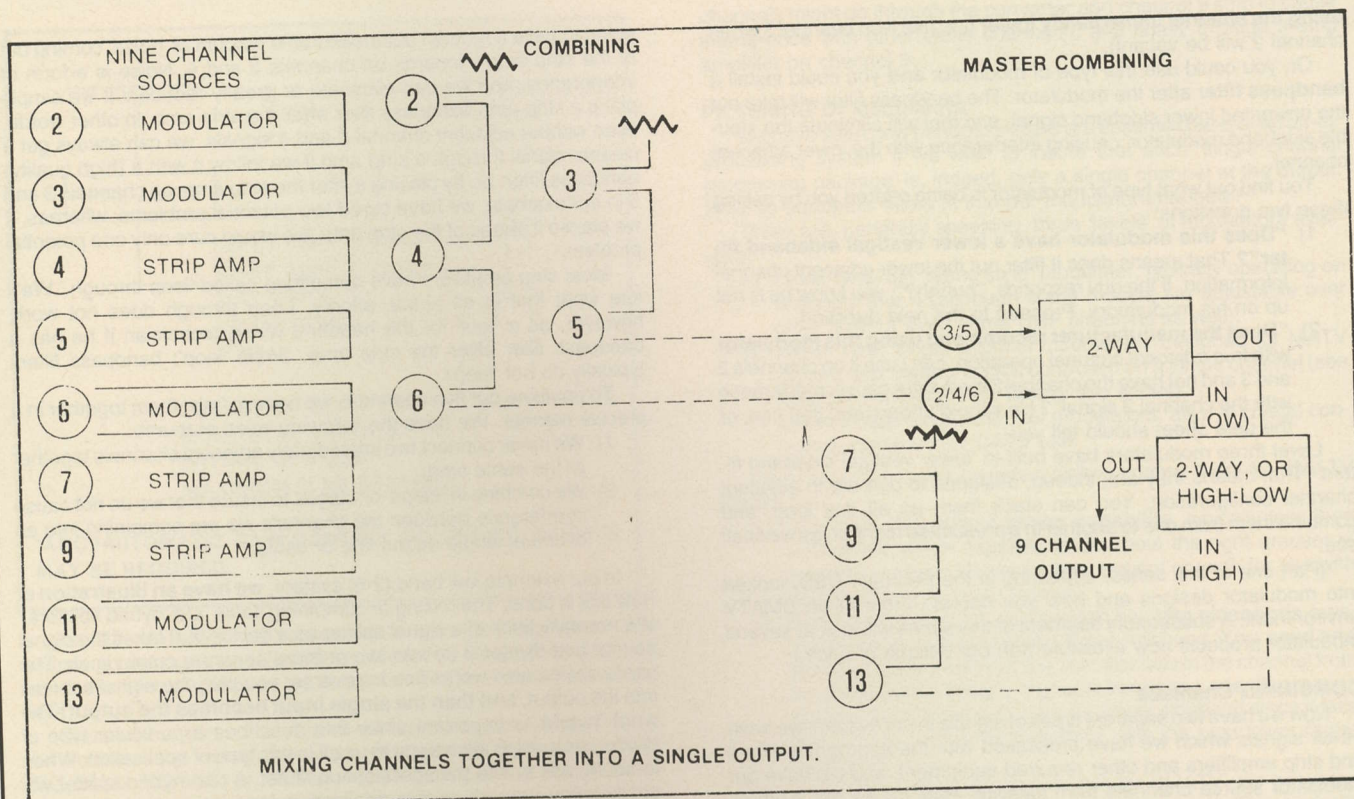
Using the 'loop through' fittings (two on each unit) we start with the channel 2, 4 and 6 set. It does not matter that one of these (4) is a strip amp and the other two (2 and 6) are modulators. We always loop from low channel to high channel (i.e. start with 2 and loop towards 6). Since channel two has a pair of fittings (two 'looped output' connectors), and we are starting here, we have to do something intelligent with the **unused** channel 2 fitting. We cannot simply leave it alone; that would provide an impedance mis-match to the system. So we insert a 75 ohm resistor, installed inside of an 'F' fitting, into one of the two channel 2 'loop output' fittings. This effectively **'terminates'** the un-used fitting. Now we take RG-59/U cable and loop to 4. Then a new piece of cable from the second loop output fitting on channel 4 to the either of the two fittings on channel 6 (they **may have** an arrow next to the fitting indicating which is the 'input loop' and which is the output loop). Now we have one fitting, on channel 6, left over. We'll return to it.

As the drawing shows, next we terminate one of the channel 3 loop fittings and connect 3 to 5; then follow the same procedure with 7, 9, 11, 13; always starting (with a terminator) on the lowest channel number and moving upward to the highest channel.

The combining sets are as follows, in a 12 channel system:

- 1) Set one: channels 2, 4, 6 in that order;
- 2) Set two: channels 3, 5 in that order;
- 3) Set three: channels 7, 9, 11, 13 in that order;
- 4) Set four: channels 8, 10, 12 in that order.





There will always be a terminator on one of the two loop fittings on the lowest channel number in the 'set' (channels 2, 3, 7 and 8 in our 12 channel example), and at this point you will have an unused fitting on channels 6, 5, 13 and 12.

Now we take a pair of two-way hybrid units and we further combine the 2/4/6 and 3/5 sets; and another two-way hybrid and combine the 7/9/11/13 and the 8/10/12 sets, if in fact all are being used.

In our example we do not have any 'set four' channels in use so we end up combining the two low band sets in one hybrid and now we have two sets left to combine; **the low band channels** and **the high band channels**. You have an option here; you can use another two-way hybrid combiner unit, or, you can select a device called a 'high/low splitter.' The combiner (splitter used backwards) is self explanatory. **What is a high/low splitter?**

As we are about to see, all hybrid splitters, used as signal combin-

ers, have 'loss.' That is, you lose signal in combining just as you do in splitting. Naturally you would like your headend output signal level, to your SMATV/CATV trunk cable, to be as strong as possible since the stronger it is, the further you can go in cable before re-amplifying the signal. Therefore you will look for techniques to keep headend 'combining losses' at a minimum.

The high/low splitter is a slightly lower loss device than a straight two-way splitter. It has a set of filters inside which allow the low band channels (2-6) to pass through one side and another set of filters which allow the high band channels (7-13) to pass to the other connector. Rather than having nearly 4 dB of splitter or combiner loss, the losses are in the 1 dB region. Again, the key word here is 'hybrid' whether you are purchasing a splitter or a high/low splitter.

LEVELS That Lower

Because the name of the game is to make all of the respective channels turn out at about the same signal strength level on the customer's television set, and because we have a number of factors within the cable system working against that goal (see broad overview in Part One of this series; February CSD), we have to do what we can to get as much signal as possible out of the headend, in a single piece of (trunk line) cable.

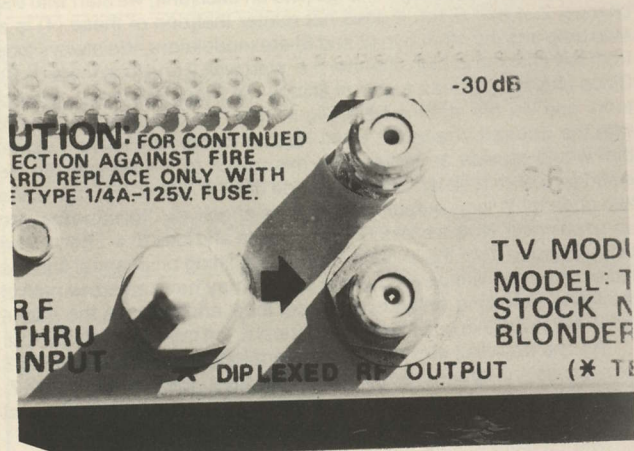
An illustration here shows what we are facing with a 12 channel system. We are ignoring whether the channels are modulators or strip amps at this point; it really doesn't make any difference to the system.

A quick lesson in the fundamentals of cable plant signal levels. The subject was covered in greater depth in the February installment, and will be covered completely in a later installment.

- 1) **All cable has signal loss;** that loss increases as the frequency (channel number) goes up.
- 2) **Higher numbered channels will end up weaker,** at the end of a given length of cable, than lower numbered channels.
- 3) One partial solution to this is to 'tilt' the output of the headend, so that the higher channels leave the headend with greater strength or power.

This is reflected in the illustration here where we have 12 operating channels.

Note that we are combining sets just as previously discussed;



CHANNEL LOOPING/ back apron of this Blonder Tongue modulator allows you to 'combine' channel output with those ahead of and behind it in 'looping set.'

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2/4/6; 3/5; 7/9/11/13, and, 8/10 and 12. Start with the channel 2 output; + 43 (dBmV). Drop to channel 6; + 45 (dBmV). More dBmVs means more (stronger) output signals from the strip amps or modulators. Notice the high band channels (7 through 13). Channel 7 has an output of + 50 (dBmV) while channel 13 has an output of + 52 (dBmV).

There is minimal loss when channels are combined through the 'looping connectors.' Now we have to get the four 'sets' of channels combined further and this requires external combiner (splitter) units, as shown.

Each time we combine two sets, through a two-way unit, **we lose 4 dB**. As you can see on the 'output side' in the illustration, we have reduced the respective levels (channels 2 and 6, 7 and 13 are shown) to allow for that combining loss.

Now we have the low channels together, and the high channels together. Which leaves one final combining operation. The illustration shows a high/low combiner which if it was another hybrid unit, would be an additional 4 dB of 'loss.' This then gives us our final signal levels to feed into the trunk cable; the line that will carry signals to the cable distribution system and the subscribers. The output to the trunk, and this is important, is now + 35 (dBmV) on channel 2 and + 44 (dBmV) on channel 13. Assuming the 9 dB of 'tilt' (the difference between 2 and 13) is correct for our system, that, then, is the total amount of

signal voltage we have for the actual trunk/subscriber line. **We lost 8 dB** in the combining process; **not an inconsequential amount.**

At this point we are ready to sit down and design the cable distribution portion of the system. We'll come back to that subject in another issue.

TEST Equipment

If you are new to the cable distribution business, you should be starting to get the point that at least a minimal amount of test equipment is essential. **Setting signal levels** at various points is crucial. **Knowing signal levels** at other points is critical. You cannot simply plug in a television set and gaze at the signal.

There are three basic test equipment tools for the SMATV system installer:

- 1) A field strength/signal level meter;
- 2) A spectrum analyzer, and,
- 3) A decent television set.

The one absolutely essential tool is a signal level or field strength meter. What is it?

Signal level is measured by a basic increment of voltage called a **microvolt**. A microvolt is 1/1,000,000th of a volt. Not very much voltage. It takes around 1,000 microvolts to produce a first class color television picture on an average TV set. 1,000 microvolts can be fractionally reduced to a more convenient number called 1 millivolt. A millivolt is 1/1000th of a volt. Still not very much signal.

Dealing in microvolts and millivolts is a pain in the neck. So the cable industry adopted a 'transfer medium.' Microvolts and millivolts are difficult (or tedious) to add and subtract; especially when you get into planning or laying out a cable television distribution plant (a subject we touched on in our February portion of this series) and you **must** do some signal level versus attenuation **calculations** for each part of the system.

And so, in the early 50's, the cable industry adopted a rather nifty system worked out by the people at Jerrold (now G.I.). They took the various microvolt and millivolt readings and using a system originally conceived by the audio engineering people, assigned a dB 'value' to the signal level which all TV sets require for a 'perfect picture'; **1,000 microvolts** (or 1 millivolt) **became 0 dBmV**. That means 0 (no) decibels above (more than) 1 millivolt (mV).

0 dBmV is not no signal; it is the amount of signal a television set needs to have to make pretty pictures. Anything lower than 0 dBmV (or lower than 1,000 microvolts) instantly told the technician he had a 'low signal level problem.' Anything above that was good; provided it was not too far above it!

We'll look at dBmVs and how you use them in a subsequent part of this series. For now, understand that it is a quick and convenient way with a signal level meter (SLM) to know where you are in a system design and operation.

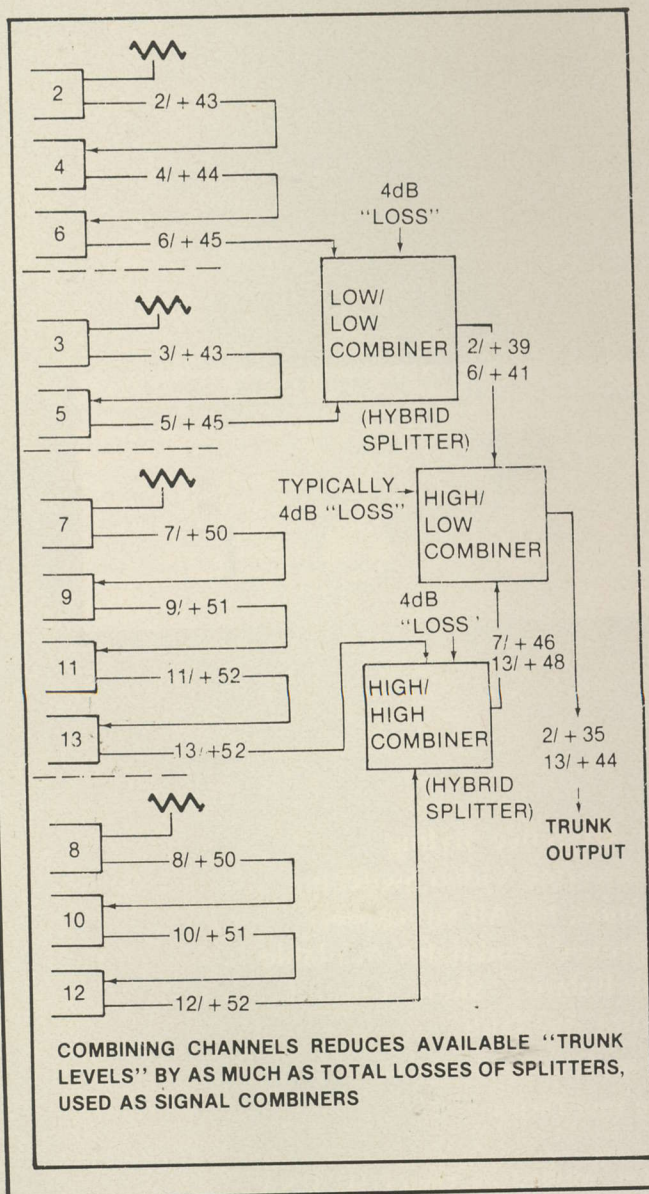
A signal level meter (they used to be called 'field strength meters' in the old days; we'll call them signal level meters or SLMs from here on) measures those dBs (microvolts). Most SLM meter scales read out directly in dBmV notations and a few still retain a second scale in micro or milli volts as well. There are SLMs from just under \$100 (typically designed to read just a few signals, such as channel 2 and 13 since those are the most important two in a typical 12 channel system), to well over \$1,000. They read out in analog (meter movement scale) or digital (digital display). We'll review some of those on the market before we get all done.

Here is **where** you need an SLM, just in the headend.

1) Off air signals:

- A) To measure how strong it is,
- B) To see if you have objectional signals on adjacent channels which might leak into your system, without bandpass filters.
- C) To adjust the output level of a strip amplifier (all have output level controls),
- D) To adjust the AGC 'window' (see page 10 here) of a fancy strip amp.
- E) To adjust the sound to picture carrier ratio (see page 9 here) for that channel.

2) Modulator channels:



Don't Try This Stunt At Home.

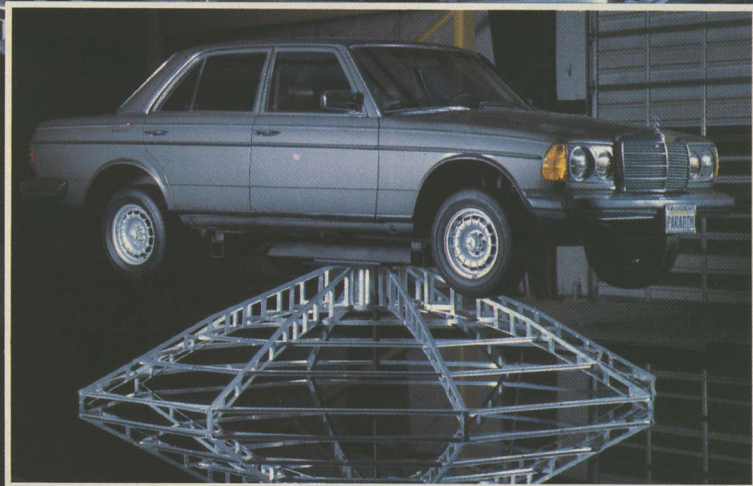


This was fun. It was a lot of work too, but it was fun seeing if we could actually do it.

It began as a little sketch on the margin of a note pad, and after a great deal of thought and a huge amount of convincing — Mike

loaned us his car. We parked a real live Mercedes Benz 300D on top of an absolutely box-stock Paraclipse antenna.

The 3.8 meter Paraclipse was assembled meshless and placed face down in a shallow pool of water. We fabricated a special steel H-shaped



rack to provide a flat surface at the balance point. The car's forward weight bias was counter-balanced with 300 pounds of steel plate in the trunk.

The total dead weight was 4,522 pounds. Total deflection under load was 1 inch and when the whole ordeal was over, the hub plate was only .45" closer to the floor than before.

Last year, during a "destruction test," we dropped 5,200 pounds of steel stock on the same antenna; so we weren't really surprised when this stunt worked.

What does it prove? Just one thing: We build a very, very strong antenna.

©1984 Paradigm Manufacturing, Inc.

Mark Fator photographer

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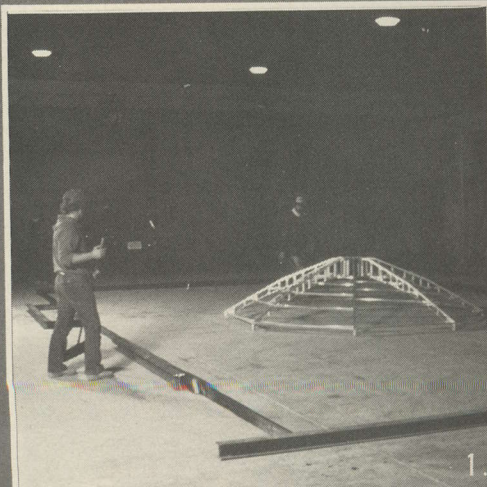
How We Did It.

1. The reflective pool required a large open space. Steel I-beams and 2x4's formed the perimeter of the pool.

2. John Steven, marketing, cleans the seam between the two 50 ft. sheets of plastic that held the water for the reflective pool.

3. Gene Willyard, production manager, looks for the balance point while Raul Espitia, tool crib mechanic; directs the crane operator.

4. Mike Andrews, Paradigm V.P. and car owner, posed for one last shot prior to moving the car to the antenna.



1.



2.



3.



4.



5.



6.



7.

5. The car is inched into place with Mike at the control switch, Gene and Raul steady the load.

6. With the full weight of the car resting on the antenna, we gingerly remove the steel tubes that were used to lift the H-rack. Left to right; Gene Willyard; Toby Elder, powder coating foreman; Bill Ulch and John Steven.

7. A final dusting before the water is turned on, 3 1/2 hours later the car was on the ground.

8. That's how we did it. We don't recommend you try this stunt at home. It isn't for the faint-hearted or the ill-equipped.

8.



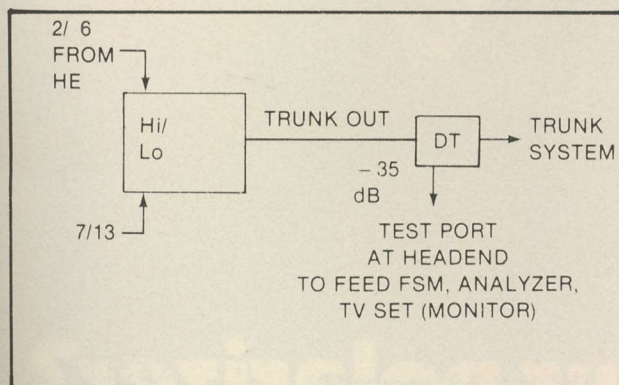
- A) To set the output level of the modulator,
- B) To adjust the sound to picture carrier ratio of the modulator,
- C) To check for strong harmonics or other problem signals coming out of a modulator, capable of causing interference to other on-system channels (see page 12, CSD for February).

Once the system is wired up, that is you have all of the channels combined, you will need to have a 'test point' at the headend. This is simply a spot where you can plug in your SLM and determine accurately the signal level to and on the trunk cable line. One of the better ways to do this is to install a device called a Directional Tap in the trunk line at the headend. It can install between the output of the last combiner (high and low channels together) and the input of the actual trunk cable line.

A directional tap is a device used within the cable system to 'siphon off' just a prescribed amount of signal to the individual subscriber 'drops' or outlets. By installing one at the headend, you have a safe and secure, interference free spot to plug in an SLM and/or a television set to check both the signal levels and the signal quality as the signals head into the trunk of the cable system.

Then there is the spectrum analyzer. An SLM is a tuneable device; it tunes in **one** TV channel and **one** TV carrier **at a time**. With it you can tune in the picture carrier for a channel, measure its level, and then turn the dial and tune in the sound carrier level for the same or next channel. You can go through every carrier on the system and measure how strong each one is; and that is important. But, you must do this one carrier at a time.

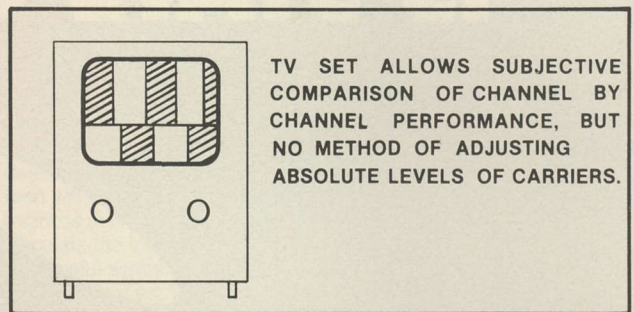
Normally, this is not as slow as it might seem and it is an adequate



Part 4: TESTING TVRO FEEDS

CONCLUSION

This series began in the December 1983 issue of CSD. In that issue we looked at how you can take various TVRO 'antenna feeds' to a competent antenna test range and determine with a high degree of accuracy the exact pattern and 'gain' parameters of an antenna feed



TV SET ALLOWS SUBJECTIVE COMPARISON OF CHANNEL BY CHANNEL PERFORMANCE, BUT NO METHOD OF ADJUSTING ABSOLUTE LEVELS OF CARRIERS.

system since you seldom have to stop and check **every** picture and **every** sound carrier at **every** location. That's why they sell 'installer SLM' units for around \$100 that spot check just channel 2 and 13; by checking the two 'extremes' (lowest and highest channels) in a system, you can be quite sure the system is functioning properly (or not properly).

However, there are times where a more advanced instrument that gives you a visual, scope screen display, of more than one carrier (or channel) at a time, is very-very handy. They call this unit a 'Spectrum Analyzer' and with such a unit you can actually 'see' on a display screen each of the carriers in a channel (including color, which is almost impossible to detect or measure with an SLM), or on several channels, or indeed the whole spectrum from 2 through 13, all at one time.

The scope screen display (to be discussed) is calibrated up and down in actual signal level, so it allows you to not only see the carriers but to measure how weak or strong they are. The width of the screen is adjustable so that you can dial up a display of anything from one carrier, to one channel (3 carriers/picture, color, sound) to a group of channels (2-6, 7-13), or, **all of the channels** on the system.

As you might suspect, a spectrum analyzer is not cheap. They begin in the \$2,500 region and go up. But for a professional doing daily SMATV work, it is an almost indispensable tool; at least for the top engineer in the company.

Because of its method of display, a spectrum analyzer is also very handy for checking out 70 MHz, 270-770 MHz TVRO IF systems. The analyzer does not care whether a signal is FM or AM; it displays either equally well. The signal level meter, on the other hand, will not properly 'decipher' an FM signal and although it may tune in the 'frequency range' of the TVRO IF signal, you cannot get accurate or repeatable real level readings with an SLM of FM TVRO signals.

This series will continue in the April issue of CSD.

system. We also discussed our testing results with a Boman EFH-75 .4 f/D feed, a Chaparral 'Super Feed,' a Polarotor by Chaparral and the Polatron III feeds. In our January report we concentrated on the recent litigation begun by Chaparral and then followed by Boman, pitting the number one and two feed suppliers in the industry against each other in California courts. Last month we looked at a Boman feed initially designed for .3 f/D applications, as well as the Chaparral .3 f/D ring adapter and the ADL feed.

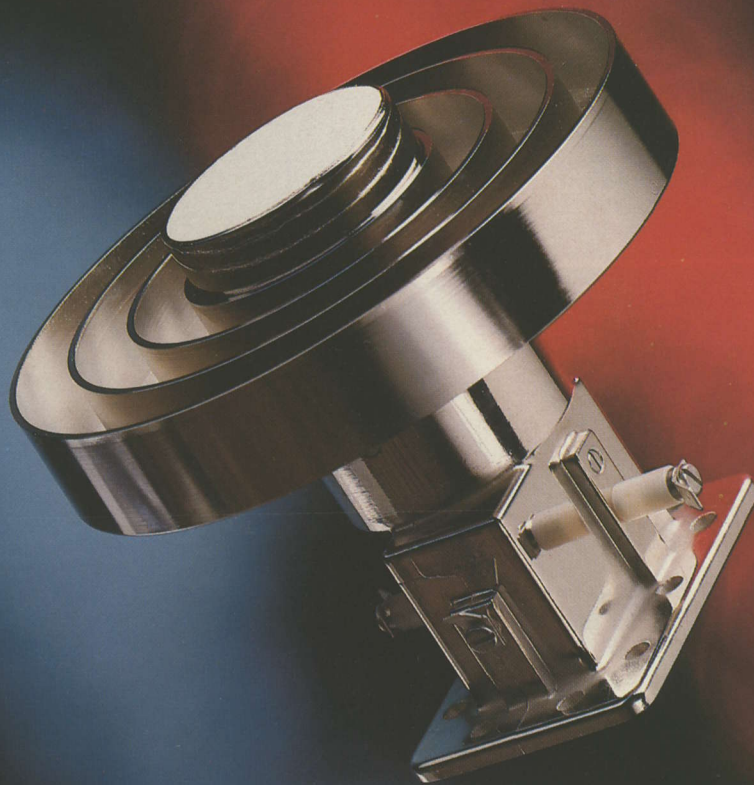
Through the series we have relied extensively on 'short range' testing; a system where a signal source transmits a series of signals over a relatively short distance to a test stand which holds the subject feed antenna. There are many other tests which can be made of feed antennas (or any antenna) and we will deal with one of those here in our concluding part.

In all, 18 separate short-range feed tests were run at Microwave Specialty Corporation in San Diego. Most of the feeds tested fell into a 'pattern' and the tests revealed only subtle and not major differences between the feeds (we'll rate them separately, here). We dealt with one feed (Boman EFH-90) which did not fall into the familiar pattern in our February report. We'll deal with another one here.

FEED Match

The short range tests tell you certain things about a feed. Because the test feed is being used as a receiving antenna, and because you

YOUR TVRO SYSTEM IS STATE OF THE ART.

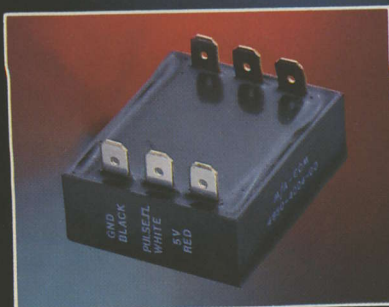


What about your polarizer?

Only one polarizer offers you the reliability of digital solid state at low cost: M/A-COM Omni Spectra. With no moving parts to freeze up or meltdown – no motors, rotors or gears – the low loss M/A-COM Omni Spectra polarizer offers you top quality reception, whether you're in Anchorage or Anaheim.

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Omni
Spectra

M/A-COM OMNI SPECTRA, INC.

rotate the feed antenna on a test stand to record the full 'pattern' of the feed, the paper record of the antenna's pattern becomes an important tool in understanding how the feed 'illuminates' (sees) the parabolic reflector surface it points at. You can, as we have, calibrate the paper record and this in turn tells you 'how many dB down' the feed's pattern is for various angles away from straight ahead. You can quickly determine, knowing the pattern and the depth of the dish, whether the feed will be 'down 20 dB' or 'down 12 dB' or whatever the number might be at the very outer edges of the dish surface. From that you can calculate the feed's ability to turn all of the satellite energy collected into useful signal for the TVRO receiver.

In the process of observing and measuring the antenna's pattern, you set up the feed antenna and receiving equipment separately for each feed tested. When you have a Boman feed on the test stand, and you have just completed a test, and you replace the Boman feed with an Omni-Spectra feed, the test meters on the range receiver instantly gives you a **clue** to the **apparent efficiency** of the new feed. Each feed is mounted, the equipment calibrated, and then you make your individual tests for the feed. There is a brief period of time as you first install a new feed when the equipment remains 'calibrated' for the feed just ahead of the present feed. The meters have certain readings and you get a quick, rough idea of the 'apparent' (but not real) differences between the last feed and the present feed.

We first noticed that the Omni-Spectra feed was 'different' by this quick, hip-shot analysis. Without re-calibrating anything, it was clear that the Omni feed did not have the same 'bulk gain' or sensitivity as the feed immediately ahead of it in the testing sequence. This indication is not to be considered hard evidence, however, since we also ran into a feed which had much higher 'apparent bulk gain' and more detailed analysis of that particular feed revealed it was not doing what its seller had intended (see page 40, CSD or February).

Once the equipment is calibrated to the feed, the antenna's pattern test is run. We did this with the Omni feed, as we had done and would do for nearly 20 others in all, and then we placed it into a separate pile. A number of the feeds tested for pattern would also be tested for something called 'match,' and, 'thru loss.'

Measuring the feed's 'pattern' is essential, but it does not tell the full story. Knowing the pattern is akin to knowing all about a football game, play by play, but minus each of the scoring plays. You may have a pretty good handle on how a team did by knowing all about the game in this manner, but absent the scoring plays, you don't know either the final score or who won. To determine 'who won,' you need the scoring plays.

A feed tested against itself is not in a contest because the antenna range test does not reveal scoring plays. To do this, you need to look at two other factors:

- 1) The feed efficiency, and,
- 2) The feed match.

The two can be related and usually are.

A feed should have a 50 ohm match. To be very precise, it should have a 52 ohm match since virtually all '50 ohm circuits' are actually **designed to be 52 ohm circuits**. Circuits have an 'impedance.' Antennas have an impedance, LNAs have an impedance, cable has an impedance. The impedance of anything is a relatively complex measurement of its ability to transfer energy from one place to another. You will usually get 100% transfer of energy when you connect a 52 ohm cable to a 52 ohm amplifier. You will get approximately 50% transfer of energy when you connect a 75 ohm cable to a 52 ohm amplifier. It is obviously important that the impedance of any two devices being mated together or inter-connected be as close to the same as possible.

The feed is the first part of your system which actually has an impedance. Your reflector on your dish has no impedance. It does not collect or carry or flow signals; it merely acts as a 'passive' reflector.

The feed's impedance should match the impedance of the LNA. Why? Because the feed's 'output connector,' a microwave 'flange' called WR-229, bolts directly to an identical flange on the front of the LNA. These flanges do not look like most connectors you are accustomed to seeing, but they are nonetheless connectors.

Within the feed, we have several complex properties that escape the casual eye. Each of these feed properties has a bearing on the impedance of the feed. The style, size and dimensions of the 'scalar



PRE-CHECKING/ of antenna range before system testing.

ring' on the front of the feed directly relates to the operating frequency of the 3.7 to 4.2 GHz band, and, the impedance of the system. The throat inside of the feed, where the energy flows from the scalar ring system, has a size and a set of dimensions which also relates to the operating frequency, and, the impedance of the system. Any 'probe' installed inside the throat has a size, and dimensions, which relate to the operating frequency and the impedance.

The energy transfer system, which takes the signal from the probe to the (flange) connector at the rear of the feed has the very same properties. All of these have to be well designed and carefully manufactured to insure that there are no 'impedance bumps' in the system.

Impedance, a critical factor, is normally somewhat frequency sensitive. The one exception to this statement is coaxial cable where a 52 ohm transmission line at 4 MHz will also be a 52 ohm transmission line at 400 MHz or 4,000 MHz. At least that is what the cable designers tell us!

Recall that the size of the throat in the feed is a function of frequency. In this case, changing the size (dimensions) will change the effective frequency of the throat. And as the frequency of the design changes, the impedance in our 3.7 to 4.2 GHz frequency band will change. In other words, the throat and all parts of the feed which are frequency sensitive are also impedance sensitive.

Anything inside of the throat or in the 'path' of the signal will affect the apparent 'size' of the components. Parts installed inside of the throat to facilitate changing from one polarization to another polarization will therefore affect the impedance of the feed system.

When the feed's match (mating one 50/52 ohm section to another 50/52 ohm section) is not perfect, the efficiency of the feed suffers. This is because there is 100% energy transfer from one part (feed) to another part (LNA) **only when** there is total impedance similarity. A change in the impedance therefore affects the 'efficiency' of the

system; some of the satellite energy collected by the feed gets 'left behind' in the feed, on the way to the LNA.

Such energy (signal) is lost; **forever**.

To design a feed 'system' which does not lose satellite signal energy, you must monitor the 'match' of the system. You do this with a special technique which couples microwave energy into the feed, allows that energy to circulate through the feed, and then measures how much energy was lost within the feed. There are two generally accepted ways to do this.

- 1) **A precise amount of energy**, a known value, is coupled into the mouth of the feed, and then you measure how much of that energy passes through to the output flange. If your energy is distributed throughout the satellite frequency range (3.7 to 4.2 GHz), and if your measurement system can detect changes in energy levels present at the output (flange) of the feed, you will be able to determine whether the feed is more efficient in one portion of the spectrum (say transponders 1-6) than in another (say transponders 18-24).
- 2) **The feed is turned around** and you couple test microwave energy into the output of the feed. Then you block off (close) the input or throat end. Microwave energy sent into the feed's output travels to the throat where it encounters a solid (metal) surface; the closure. Since microwave reflects from solid surfaces (remember your parabolic dish is a 'solid' surface), the inward bound energy bounces off the closure and comes back out again at the output flange. In the process it has gone through the feed two times; once in, once out. If you measure or know how much went in, and you can measure how much comes out, then the 'loss' of the feed is determined by taking the first number (input to output flange) and subtracting the second number (output from output flange), and, dividing by two. Why divide by two? Because the microwave energy path went through the feed two times; once in, and once out.

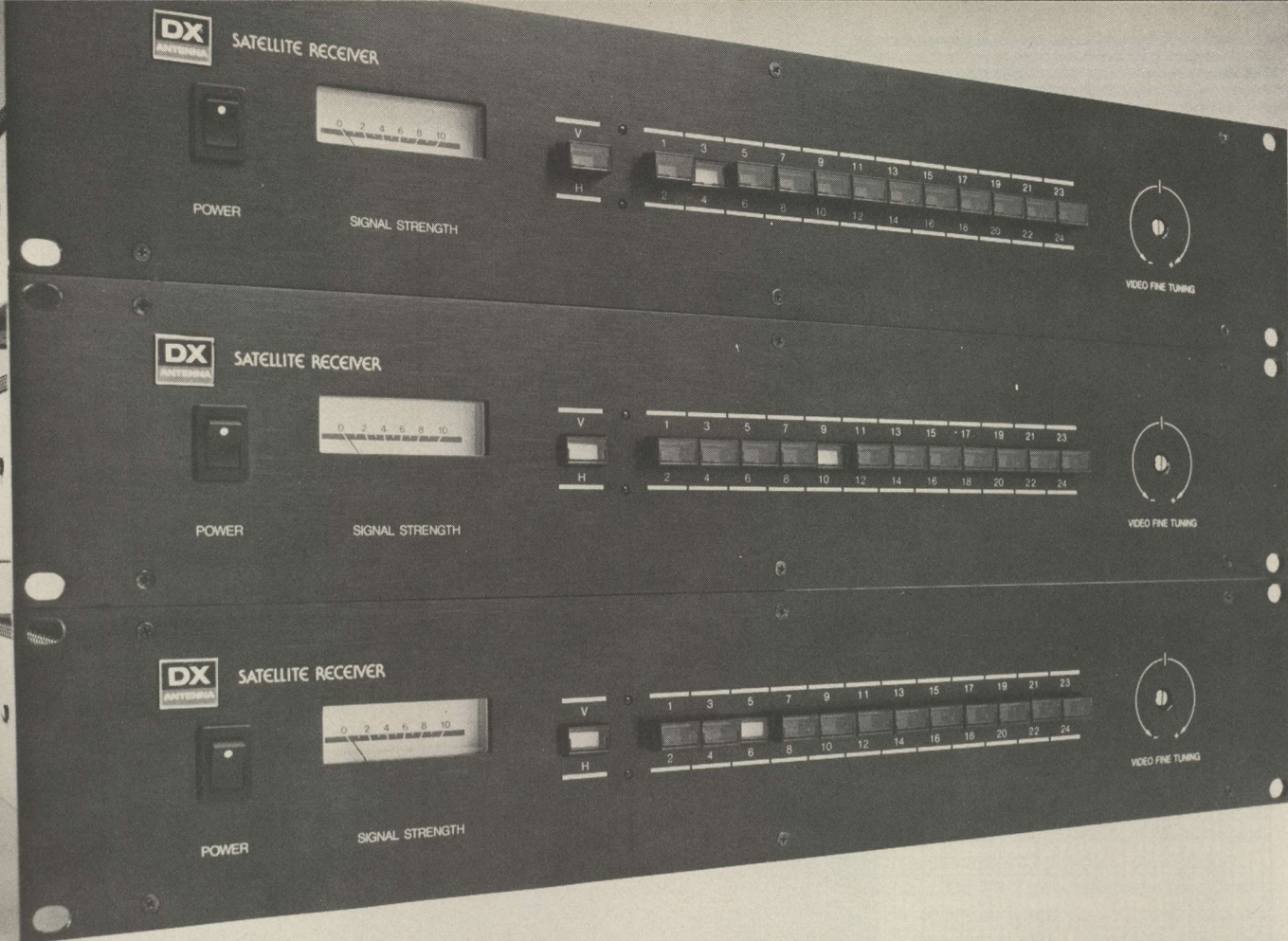
BACK To The Omni

Tests on the 'short' antenna range gave us a preliminary indication that something was 'different' with the Omni feed(s). We had two, by the way, and when we found the unusual 'readings' with the first we checked it again on the second. Both came out, on the short test range tests, about the same.

What we thought we saw on the short test range was a reduced output level from the feed. As we described in our February installment, you can have a feed shaped 'pattern' which is **very narrow**, and which therefore would support a dish with an f/D in the .5 to .6 region. Such a feed, as we found out in February, will have a **preliminary indication** on the short range of 'additional gain.' The opposite of such a feed would be one with an exceptionally broad pattern; one that would be ideal for antennas in the .25 to .3 f/D region. To determine what was happening with the Omni feed(s) we first completed the short range tests. **The results are shown here;** note that we are calling out the 3 dB points and the 12 dB beamwidth points as we have



FEEDS TESTED/ data is recorded for analysis.



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Now you can have top quality performance for a surprisingly reasonable price. The DSA-643 Satellite Receiver from DX features dual, **block downconversion**—unique for receivers in this price range. The DSA-643 uses a discriminator circuit for signal demodulation; a full 30 MHz bandwidth; and a unique threshold extension circuit. These features add up to a low threshold carrier to noise ratio, commercial quality reception and low cost installation in any system.

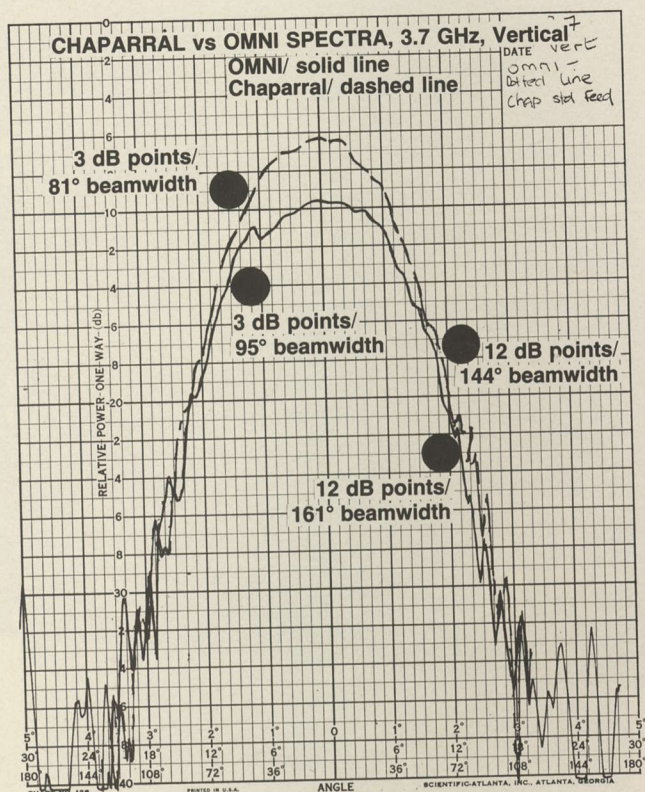
DX also provides the DSA-541 Block Downconverter. It features a highly stable ceramic resonator, with a fixed frequency of

2800 MHz. Stability is maintained at a remarkable ± 1 MHz over the entire -30° to $+50^{\circ}\text{C}$ temperature range. So you can install the downconverter out of doors, at the dish, without concern for frequency drift caused by temperature changes year after year.

The innovative DSA-643 Satellite Receiver and DSA-541 Block Downconverter are brought to you by DX, one of the most respected names in satellite television reception systems in Japan and around the world. DX also provides line amplifiers, power dividers, and other block downconversion-compatible accessories.



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OMNI SPECTRA diode-switching feed (solid line) versus Chaparral feed (dashed line). The 3 dB points on both are called out, as well as the 12 dB points. See text.

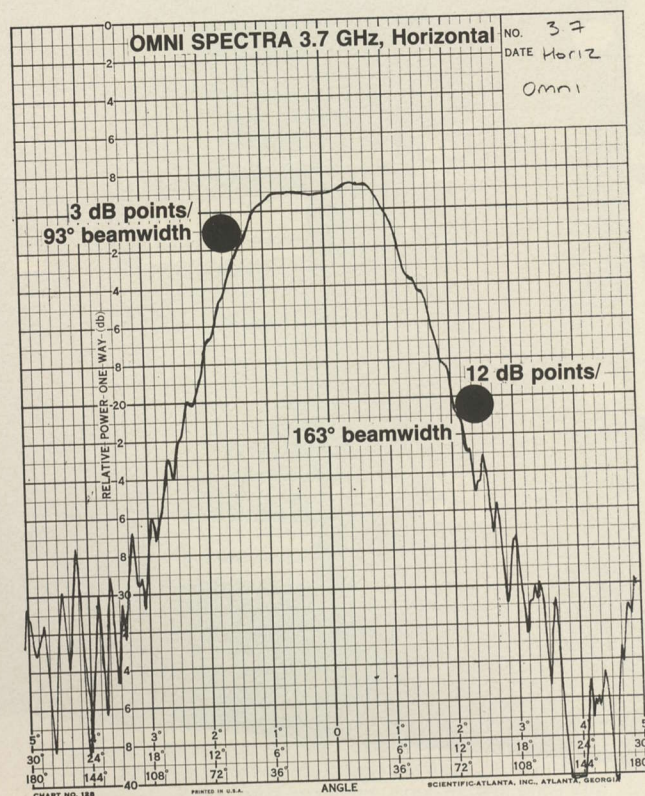
done with all prior feeds reviewed here.

In the first pattern plot we have a dual trace; the first, solid line, is the Omni-Spectra feed at 3.7 GHz, vertical polarization. It has a certain 'amplitude' or strength up the graphic plot. Higher up means more overall feed efficiency or 'gain.' The dashed line also on the same graph is our reference antenna for these tests; a Chaparral 'Super Feed.' Note that it has a higher display on the paper graph, indicating it was exhibiting greater efficiency as a feed device.

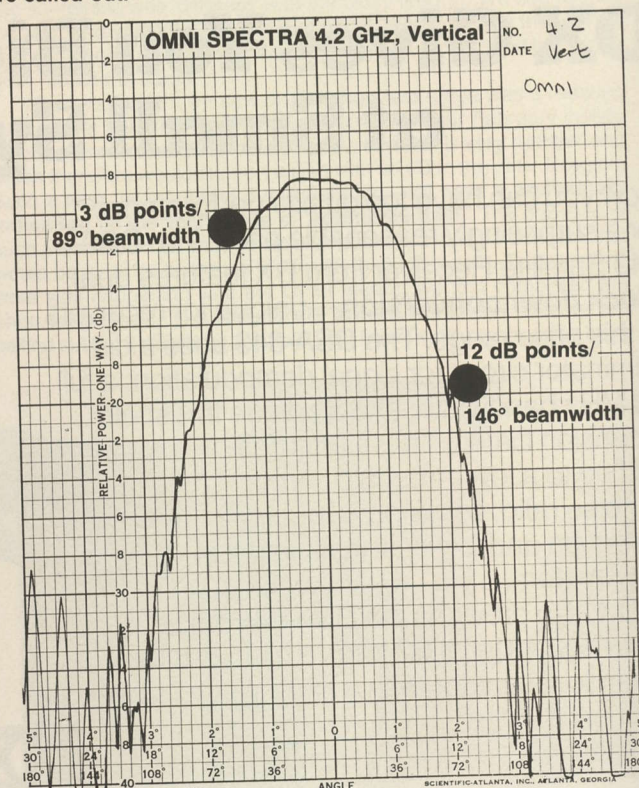
Subsequent graphs revealed that the Omni feed had an **exceptionally good** 'nose pattern' through the 3.7, 3.95 and 4.2 GHz frequencies, both vertical and horizontal polarization. On this basis alone, without considering the 'efficiency factor,' the Omni was as good as or better than any other feed tested. But the apparent 'loss of signal' was troublesome.

A TVRO system can lose signal in two different areas, and you have two different concerns.

- 1) **A system that has low reflector efficiency** (due to some non-parabolic shapes in the reflector surface) loses signal forever. You cannot replace lost "dBs" which have disappeared because of an improper reflector surface. You have the same basic 'bottom line' when signal that is captured by the feed is somehow not properly coupled into the LNA. Any signal that is lost, due to system inefficiencies, **prior to (LNA) amplification**, is lost forever. You cannot amplify something that is gone.
- 2) **A system that loses signal AFTER the LNA** still has a chance of making good. Once the weak signals have been amplified, you have established a signal-voltage-level which can be further amplified if you happen to run out of 'steam' someplace between the LNA output and the input to the TV set. However, the LNA establishes the system's carrier to noise (signal to noise) 'ratio' for the balance of the system. That ratio is actually your 'TVRO Performance Grade'; a high ratio means good pictures, a low ratio means poorer pictures. You can maintain



OMNI SPECTRA feed at 3.7 GHz, horizontal. 3 and 12 dB points are called out.



OMNI SPECTRA feed at 4.2 GHz, vertical. 3 and 12 dB points are called out.



SR-2

The SR-2. Advanced therapy for a healthier picture.

Your customers want a proven prescription for a crisp, clear picture with distortion-free audio. Now you can give it to them with the new second generation SR-2 Receiver System. It's the break-through Rx.

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the same **RATIO** after amplification, and not get totally shut down. You cannot maintain that ratio if signal is lost **BEFORE** amplification.

We then took the Omni feed(s) indoors to a test bench where a test had been set up to measure the 'match' (and the efficiency) of the feed itself. We have already discussed how this is done; the results come out on graph paper which gives you a written 'plot' of the performance of the feed over the frequency range of interest.

Now the Omni feed is a little different than others in the marketplace; it does not move a probe (ala Chaparral, Boman) to change polarizations. The more 'conventional' feeds have a **single probe** inside of the throat, and as we saw in the January **CSD**, the probe is a section of 'transmission line' plus a moving 'antenna' that sucks in the signal. The Omni, like the **Syntronic** units recently brought to the market, has **two probes** inside of the throat. One of those probes is designated as the 'vertical probe' and the other is designated as the 'horizontal probe.' The installer rotates the feed so that when you are pointed at a satellite, your two probes align properly; one to each of the two polarized signals coming to the dish.

When you have two probes inside of the feed, you have not one but two potentially disruptive 'chunks of material' inside of the throat. You will recall that **anything you insert** into the throat of the feed is going to change the 'apparent dimensions' of the throat, and possibly cause an imbalance to the rather delicate 'impedance' of the throat and feed system. This type of feed system would be called a 'switched feed' rather than a 'rotating feed.' The system operates by **alternately selecting one, or the other**, probes and connecting the selected probe to the TVRO's LNA and receiver.

Selecting between the two would seem to be a matter of simply 'toggling' or switching. A relay, for example, is a switching device; it has one output and two inputs and by turning the relay on, or off, you select which of the two inputs is connected to the output. Unfortunately, at microwave frequencies, relays are not very good performers. Their physical mass is considerable, even in miniaturized versions, and one thing you don't need in the path of the signal is more mass

(remember the impedance problem)!

There is another device which does about the same thing as a relay or various versions of a relay (other similar devices are called 'Reed Switches,' etc.); it is **called a diode**. A diode is something you normally expect to find in a power supply, or, in a TVRO demodulator. There are special 'microwave diodes,' however, which can function as 'switches.' The diode 'turns on' and it 'turns off' when different voltages are sent to the diode.

By installing a diode to each of the two probes in a feed, and connecting the diode to something else, you can use the diodes to 'switch' incoming vertical and horizontal signals. There are at least two ways to do this:

- 1) **The diode can install between the probe output and the LNA input.** When you apply a particular voltage to the diode, signal will flow through the diode and into the LNA. Or you apply another voltage, or no voltage at all, and the diode 'shuts off'; no signal flows. In this case **the TVRO signal actually goes through the diode**, on its way to the LNA.
- 2) **The diode can install from the output of the probe to 'ground.'** Both of the probes are connected, full time, to the LNA 'input.' But when you apply a voltage to one of the diodes on one of the probes, it turns on the diode and the microwave energy on that particular probe is carried (or shunted) to 'ground.' In effect, you are shunting either one probe or the other probe to ground; creating a 'short circuit' when you select between probes. In this way the TVRO satellite energy **does not pass through the diode on the way to the LNA**; it only goes through the microwave diode when you are 'turning off' that particular probe by connecting the probe, through the diode, to ground. Connecting the probe to ground 'shorts out' that probe's satellite energy and leaves but one probe actively sending energy to the LNA itself.

If the feed uses the first technique, where the microwave energy passes through the diode to the LNA, you have a new factor to consider; the diode has 'loss.' It is not 100% efficient. Remember we are still 'in front of' the LNA and the first amplifier stages at this point, so any loss at all will degrade or reduce our signal to noise/carrier to noise ratios. **Loss here is loss forever.** The amount of loss when you couple 3.7 to 4.2 GHz signals through a (microwave) diode varies; it can be as much as 2 dB even with a 'quality' (meaning expensive) microwave diode. A 2 dB loss on a 10 foot dish system, attributed to the use of **in-line** microwave switching diodes, would reduce the effective size of the TVRO dish to around 8 feet. Obviously this is not a good choice.

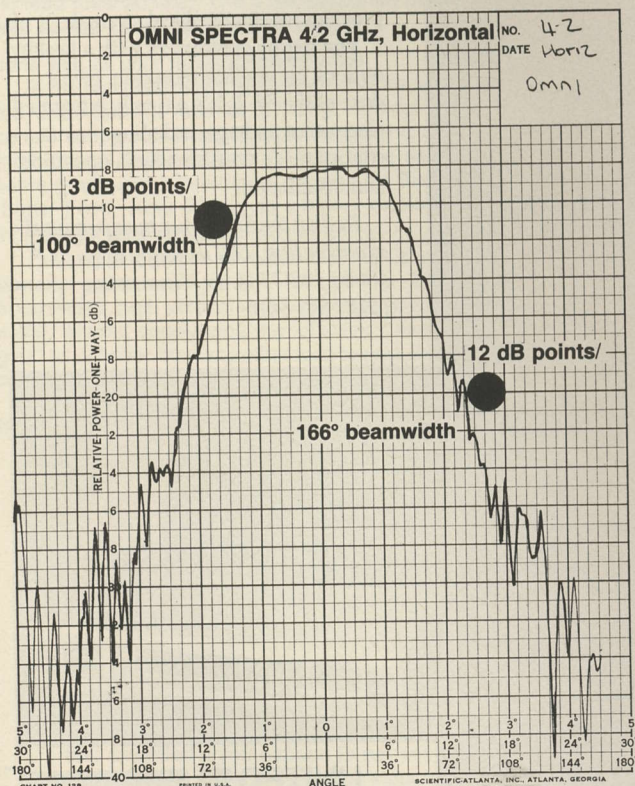
If the feed uses the second technique, **there is in theory no loss** when you 'shut off' one probe with the diode 'switch.' When you have both probes feeding the TVRO receiver, and no voltage connected to either diode (one on each polarization), you get signal from both probes at the same time; in theory. When you turn on one of the two diodes, effectively shorting that probe to ground and leaving behind only one probe connected to the LNA input, you still have the signal in the selected polarization going directly from the probe to the LNA input without having gone through a diode.

However, there is an 'electronic circuit' involved and that circuit occupies a physical position in the system where it could, possibly, add some 'impedance mis-match' to the flow of satellite energy to the LNA.

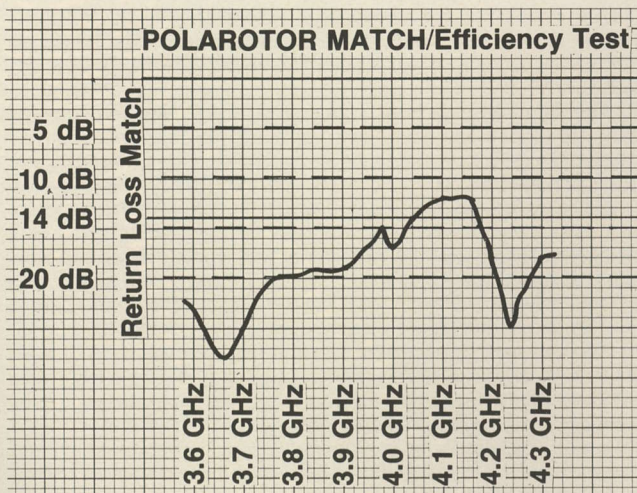
There are three separate plots shown here. One is for the Chaparral Polarotor feed. The second is for the Boman EFH-75 series feed (this feed is no longer in production in the format tested in October). The third is the Omni Spectra feed.

You will note that the Omni Spectra feed has a pair of 'plot lines.' When you use or test the Omni feed, you must first make sure only one of the two probes is 'active' and then you run your check on that 'polarization.' Having done this, you repeat the test by reversing which of the two polarizations (i.e. diodes) is active.

Across the top of each plot is a more or less straight line. This is the reference signal source; the output of the signal generator system. A 'perfect feed' would have a second (and third in the case of the Omni) line below the top reference line which was 'infinitely below' the top reference line. In this case, **the bigger the difference between the top (reference) line, and the bottom measurement line(s), the better**



OMNI SPECTRA feed at 4.2 GHz, horizontal. 3 and 12 dB points are called out.



CHAPARRAL POLAROTOR 1 feed system match efficiency; horizontal scale is frequency, vertical scale is match in dBs. See text.

the match of the feed. Since match is frequency sensitive, because the feed is somewhat frequency sensitive, we have a variation shown between 3.7 GHz (the 'low end' of the satellite TV band) and the high end (4.2 GHz).

Where there are very pronounced increases in the height of the bottom measurement line (i.e. the distance between the top reference line and the bottom measurement line 'narrows') you can be sure that in this particular frequency/transponder region the efficiency of the feed is 'down.'

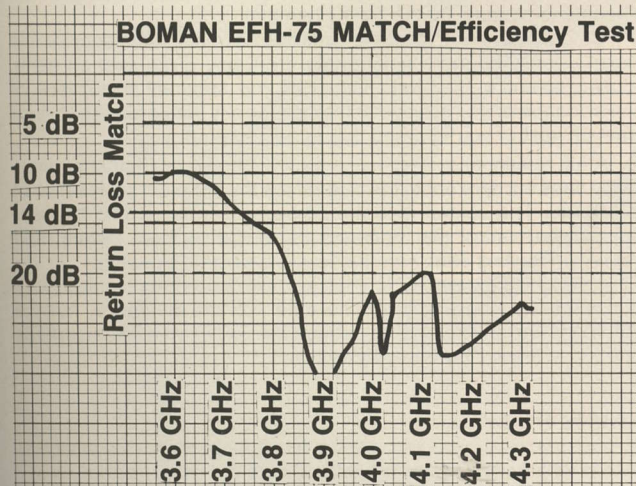
There are several ways to look at these measurement results:

- 1) The **average 'match'** (there is a number here);
- 2) The **'best case'** match;
- 3) The **'worst case'** match.

If you dig far enough into most of the available feed's descriptive technical literature, you will learn what the 'match' is. A number, claimed, in the 15 to 20 dB region is not uncommon, nor necessarily bad. The dB numbers tell you how much power sent into the feed, in this test, would come out the opposite end. Provided you had an LNA at the output end of the feed which matches the impedance of the feed itself (when both are referenced to 50/52 ohms).

Let's take some representative numbers.

Two numbers are commonly used in creating 'known numbers' for system match. One is expressed in dBs and the other is a ratio. All of the literature and data you are apt to encounter will be in dBs. But you



BOMAN EFH-75 feed system match efficiency; horizontal scale is frequency, vertical scale is match in dBs. See text.

should understand what the dB number really means if you are to pass judgement on the true efficiency of the feed.

Let us assume the match is 'perfect'; that is **all** of the satellite signal energy that comes into the feed shows up at the output of the feed, and, **all** of that energy travels into the mouth or throat of the LNA. That would be a 100% efficient system. In such a system:

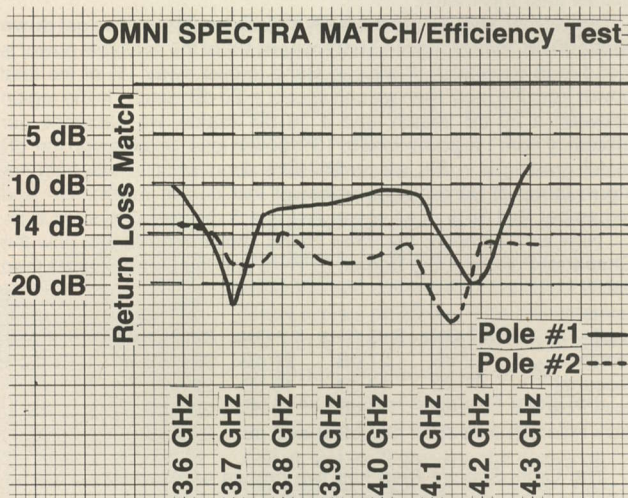
- 1) The match could be said to be 1:1, or,
- 2) The match could be said to be 'in excess of 30 dB.'

Let's deal briefly with the '1:1' number. It means that for every part of energy that does go into the device ('1'), an equal amount of signal ('1') goes out of the device (or, alternately, from one device to another where the two are inter-connected). Hence a ratio; '1:1' or as sometimes expressed, '1 to 1.'

Now suppose that we lost some of the power, either within the device because of impedance 'mis-matching' internal to the device, or in the coupling of one device to another. Here are two examples:

- 1) **10% of the voltage** is 'lost' due to mis-match, equal to a 'voltage mis-match' of 1.1 to 1.
- 2) **50% of the voltage** is 'lost' due to mis-match, equal to a 'voltage mis-match' of 3.16 to 1.

Power is one increment of measurement; **voltage** is another. There is 'signal voltage' present in the feed **but there is also** signal 'power'; and power is the product of voltage and current. **Both** are present in the signal waves.



OMNI SPECTRA feed system match/efficiency. Horizontal scale is frequency (3.6 to 4.3 GHz), vertical scale is match in dBs; or efficiency of the feed system. Solid line is 'pole #1'; dashed line is 'pole #2.'

When we include the 'current' factor, resulting in 'power,' the actual mis-matching numbers **now become** as follows:

- 3) **10% of the power** is lost due to mis-match, equal to a 'power mis-match' of 2.0 to 1.
- 4) **50% of the power** is lost due to mis-match, equal to a 'power mis-match' of 7.0 to 1.

Now a 50% power loss would seem to be astronomical; would that not make a 10 foot dish act like a 5 foot dish? Is 5 feet not half (50%) of 10? Fortunately, for several reasons, this is **not** the case.

When you lose 50% of the signal, you are actually losing '3 dB' of signal. That means a dish that is capable of 42 dB of gain with a 100 percent efficient feed will have a realized gain of 39 dB if 50% of the signal is lost in the feed system. Since 50% seems like a lot to lose, what are some more intermediate numbers?

We'll return to this shortly. The other measurement technique is to relate the match to dBs. For example, the data sheet may tell you the **'worst case match is 12 dB.'** What on earth does that mean?

If you know that a certain percentage of the power can be lost due to mis-match, then we can assign dB numbers to those losses. Here is an abbreviated table that does just that.

Match dB	% Power Lost
30 dB	.001%
25 dB	.003%
22 dB	.006%
20 dB	.010%
18 dB	.016%
16 dB	.025%
14 dB	.050%
12 dB	.080%
10 dB	.100%
8 dB	.158%
6 dB	.251%
4 dB	.398%
3 dB	.501%
2 dB	.631%
1 dB	.794%

Another way of looking at the table's bottom or worst case line is to consider that if we have 1 dB of the total power available in the feed getting into the LNA, we have 1.000 - .794 or only .206 of the power actually getting to the LNA. Those numbers are in percents of a whole '1' so we are dealing here with **1 being all** of the available signal and **anything less than one** being the actual signal through the (feed) device after mis-match.

As you can see, we are not really in deep trouble until we get **down** to the 20 dB 'match' region. That's where 1% of the available power is lost due to mis-match. If we can stand to give away 1% of the total power from the feed, then we can accept a '20 dB match.' In the region between a 20 dB 'match' and a 10 dB 'match' we decrease our efficiency from 1% power loss to 10% power loss. So although the 'dB match grading' is in dBs, we can still think about what is really happening in terms of percentages of power lost due to mis-match. And remember that 50% of all power lost is a 3 dB overall system loss.

Now we'll compare the three charts shown here to see how the Chaparral Polarotor, the Boman EFH-75 and the Omni-Spectra feed did.

Feed	3.7 GHz	3.95 GHz	4.2 GHz	Best Case	Worst Case
Boman	12 dB	27 dB	27 dB	35 dB +	12 dB
Chaparral	27 dB	18 dB	18 dB	27 dB	12.5 dB
Omni Pole #1	22 dB	11 dB	19 dB	22 dB	11 dB
Omni Pole #2	18 dB	17 dB	16 dB	24.5 dB	16 dB

The Omni-Spectra feed has two probes so you have a pair of separate readings to take. They are not identical, in our test results, as you can see.

There are several ways to evaluate these results:

- Lowest** match loss / Boman EFH-75, around 3.92 GHz;
- Highest** match loss / Omni Spectra Pole #1, around 4.0 GHz;
- Most consistent** match (smallest variation) / Omni Spectra Pole #2

There is a perhaps better way to evaluate the performance however; comparing what percentage of the total region between 3.7 and 4.2 GHz the tested feeds attained a match of say 20 dB or better. Remember, if the match is **20 dB**, we are losing only **1% of the total** power available. Since the results were plotted on 'grid square' graph paper, we simply took the total number of grid squares between 3.7 and 4.2 GHz (25 total) and then checked how many grid squares had a match of 20 dB or better. From that we created a simple percentage which translates to bandwidth where the match is 20 dB or better.

Feed	20 dB (1% loss)	14 dB (5% loss)
Boman	60%	88%
Chaparral	20%	72%
Omni #1	12%	22%
Omni #2	16%	100%

Now, what do these numbers mean?

The Boman first. There is 60% of the bandwidth between 3.7 and 4.2 GHz which has a match of 20 dB (1% power loss) or better. If you 'lower your standards' to a 14 dB match (5% power loss), we have

88% of the Boman feed meeting or exceeding that 'match point.'

The Chaparral. Twenty percent meets or exceeds the 20 dB match level; 72% has a match equal to or better than a 5% power loss factor.

The Omni Spectra feed, pole number 1 first. Twelve percent of the 3.7 to 4.2 GHz spectrum has a match of 20 dB or better; 22% has a match of 14 dB or better. And the second pole on the Omni; 16% was 20 dB or better, and 100% (all of the spectrum) was 14 dB or better.

Some discussion. If you had a bad 'loss/match spike' in a particular part of the spectrum between 3.7 and 4.2 GHz, you could have a very inefficient feed for say a transponder or two. Notice that we can have rather **abrupt rises** (Chaparral between 3.7 and 3.8 GHz) and falls (Boman between 3.9 and 3.94 GHz). An abrupt dip probably cannot hurt; an abrupt rise (poorer match, greater loss) is another story.

You can see that since all of the **rotating probe polarizer** devices are individually hand tuned ('tweaked,' in the trade) by a technician before they are shipped, and the position and length of the probe does have a dramatic impact on the performance of the feed, that you might get a feed which has been improperly 'tweaked.' **That could explain** why you have a feed that performs badly over the full band, or, just in a portion of the band.

There is less 'tweaking' involved in the Omni-Spectra feeds, **but at** the same time **there are component part differences** which have the same effect; improving, or degrading, the overall match of the system within the 3.7 to 4.2 GHz region. The Omni feed shown was one of two we checked. Both had similar (but far from identical) characteristics; one pole on each was always better, by quite a bit, than the other. If you had a way to determine, in advance, **which** was the 'hot pole' and which was the not-so-hot pole, you would be wise to position (mount) the feed to make the hot pole correspond to the weaker transponder sets (either vertical or horizontal, depending upon the birds of interest) at your location. This is not always possible, of course.

The bottom line on feed match is this:

No two feeds, from the same manufacturer, will be alike. No single design, in our view, is clearly superior over any other design; as far as 'match' and loss are concerned. You will see far more variation between feeds of the same brand than you are likely to verify between feeds of different brands. If you find yourself having a difficult time making an installation perform properly, try replacing the feed with a new one; and another new one. You may be surprised how much difference it makes, especially on weak, marginal signals.

POLARIZATION Control

All of the feeds tested have two purposes; **to capture and couple**, with maximum efficiency, the parabola collected signal into a single spot; the mouth or entrance to the LNA. **And**, to allow the user **to selectively pick off** one polarization, or the other, as he changes from channel to channel on his TVRO terminal.

Unfortunately, not all of the satellites have the same approach to polarization. And more unfortunate, from any given spot on earth, looking up and at the Clarke Orbit Belt, the 'apparent polarization' of the signals changes as you run through the sky from a bird which is far east or west of you to a bird that is due south of you.

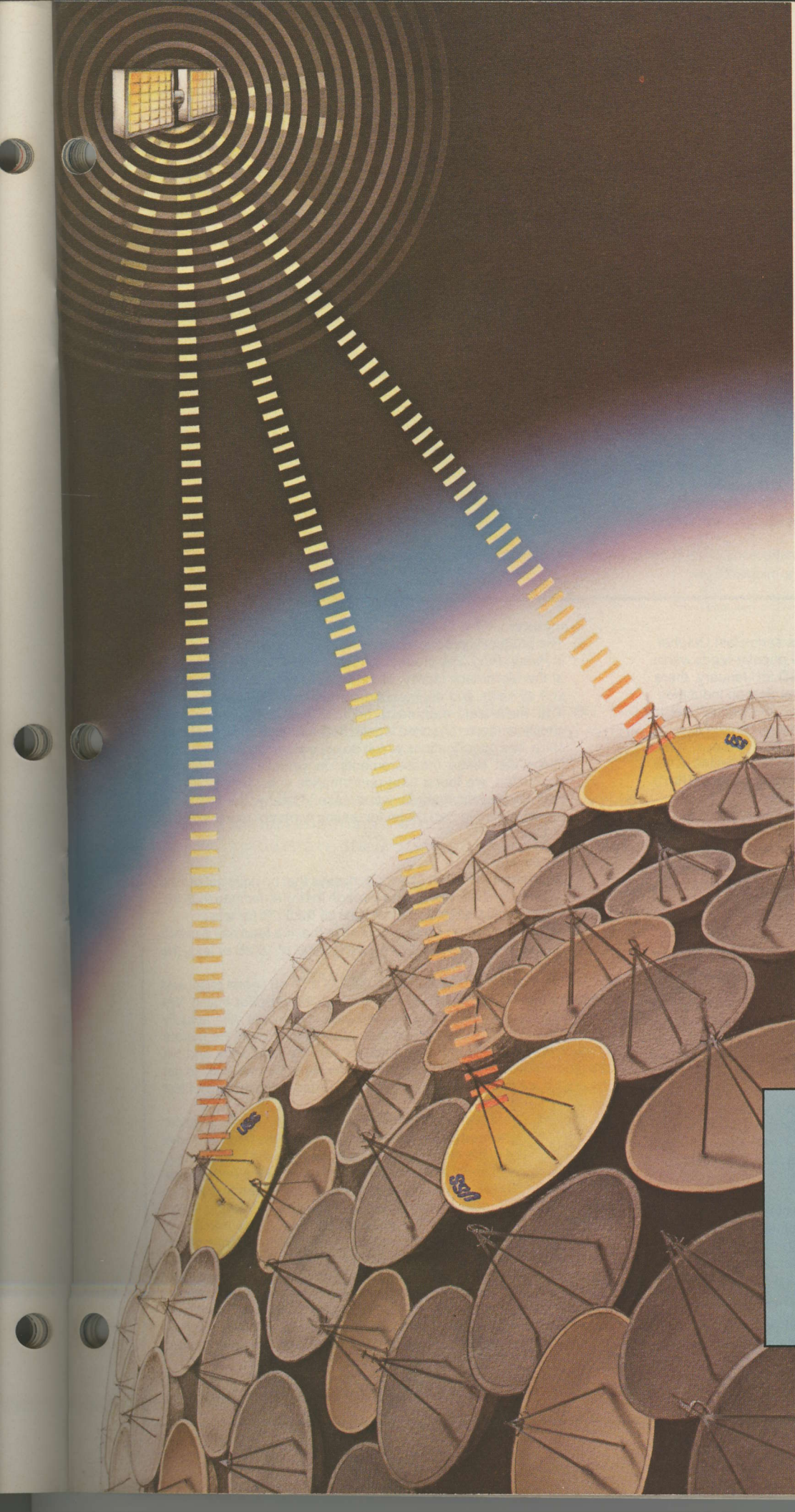
A full rotational system, such as the Boman or Chaparral units, really does not care about the true versus the apparent polarization of a satellite. The control over the probe is continuous and the user adjusts the control that operates the probe for best picture, and maximum 'nulling effect' on the opposite polarity signal(s).

A switching system, which has **just two positions** (vertical, and, horizontal) has no ability to 'fine tune' for this difference, nor the difference one finds as you go through the sky from the higher up birds and those lower down on your horizon.

RATING The Feeds

We promised we would rate the feeds for performance and other factors which we deemed important. Here are those ratings.

The ratings are both hard analysis and opinion; see asterisks (*) at bottom of chart. You **cannot** 'sum' the vertical columns under each feed and come to a 'total' for each feed simply because you are



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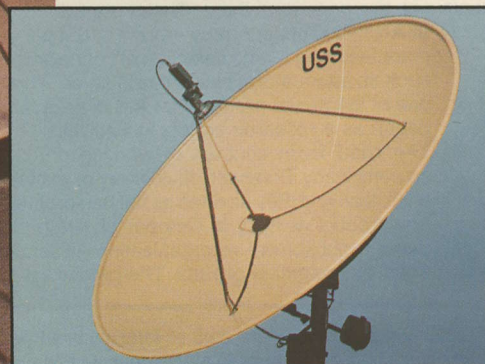
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comparing apples and oranges. In any single category, 10 is the maximum rating while 0 would be a minimum rating. No polarization

control is available with the Super Feed, a function of design, so it rates a '0' in this category.

CATEGORY	Chap. Super Feed	Chap. Polarotor	Boman EFH-75	Boman EFH-90	Polatron III	ADL	Omni Spectra
Documentation	5	5	5	5	*	10	5
Durability (**)	10	6	8	8	8	*	8
Full Polarization Control	(0)	10	10	10	10	6	6
Illumination Pattern							
.3 f/D	4 (***/10)	4 (***/10)	4	2	4	5	4
.4 f/D	10	10	10	8	10	10	10
.5 f/D	4	4	4	10	4	4	5
Instructions	8	10	10	10 (***)	*	*	10
Match/efficiency	10	8	9	9	8	8	6
Packaging	10	10	10	10	*	5	*
Price	5	8	9	9	9	*	8

*/ Means not available or missing with unit CSD acquired for test.

/ Very **subjective evaluation based upon limited experience with each unit in field.

***/ Chaparral Super Feed and Polarotor feeds equipped with special .3 f/D adapter ring will always outperform the same feed not equipped with the adapter ring, on a .3 dish.

****/ Boman EFH-90 unit received for test had instructions for .3 f/D dish but in reality, feed was for dish in .5 to .6 region. Following instructions literally, using the feed on a .3 dish, would be a mistake.

ADDITIONAL Feed Tests

When CSD began the research work on this series last October, we selected a variety of the top seller and more popular feeds within the industry. Since that time, as reported in CSD for January, there have been substantial changes in the feed line at Boman Industries. Between our research and documentation, and the printed words here, the Boman feed line tested has all but disappeared. No tests have yet been performed on the replacement feeds from Boman although we understand that Boman is having their feeds tested at the same test range in San Diego (**Microwave Specialty Corporation***) which CSD selected for our own tests last October.

We will revisit feeds again, as the industry matures and changes. A number of new feeds are promised within the next 30 to 120 days, by both established feed suppliers and some new market entrants. Hopefully, having read your way through this four part series, **you will be in a better position** to ask the 'right questions' of the feed sales people who come to call on you!

THE OTHER Side Of Omni-Spectra

Test results here suggest that the Omni-Spectra Polarizer system **may not** be the most efficient system in the industry today. Because Omni is an **M/A Com Company**, with a reputation for quality products in a wide variety of fields, these test results 'bothered' us. While certain the results of our tests were correct, there was the lingering suspicion that we may have overlooked something in our testing program. For this reason Coop traveled to Merrimack, New Hampshire during February to inspect the Omni facility and explore the product in greater depth with the personnel there. These are our findings:

- 1) **M/A-COM OSI** generates around \$16M per year in revenues, manufacturing a **wide selection of connectors, passive devices** such as attenuators, splitters and so on. The Polarizer feed is one of the newer products for this division although it actually began as a research project in February of 1982.
- 2) **The road from** concept to working product has not been smooth; early Polarizer devices went exclusively to National Microtech and they as often as not had problems. Following the first product delivery in October of 1982, the Polarizer went through substantial re-organization in January of 1983 and again in September of 1983. **The product is now considered**

*/ CSD wishes to thank the staff of **Microwave Specialty Corporation** of San Diego, and in particular corporate **President Carl Grindle** and **Chief Engineer Duane Tubbs** for their skills and assistance extended to both CSD and the home TVRO industry in making these tests for us.

mature.

- 3) The product is produced in an Omni production facility located in Puerto Rico. The product is quality-checked before shipment at the Merrimack facility; all returns come to New Hampshire and all sales and engineering comes from Merrimack.
- 4) **The Polarizer**, manufactured in Puerto Rico and initially checked there, checked again (individually) in New Hampshire, has specifications which do not correspond with our San Diego test range measurements. In virtually every test we conducted, we found feed performance substantially 'worse' than Omni describes as 'worst case.' Clearly, the two Omni feeds we had in San Diego for testing were not representative of Omni's best.

Let's see why.

- A) **Maximum Through Loss**: Omni says that no units get out the door if there is a worst case through loss greater than 0.35 dB. Typical units have a through loss of 0.25 dB (or less).
- B) **Maximum Match Loss**: Omni says that if a feed has a match anyplace within the 3.7 to 4.2 GHz band of 16 dB or less, the feed does not 'ship.'

We measured through losses as high as 0.75 dB (worst case) and we also traced a correlation of high through loss to poor match. We discussed this with **Don Cloutier**, the project engineer who actually created the Polarizer design and then stuck with it to get the mature product they have today. Don took us into the laboratory and we proceeded to 'mis-handle' Polarizers to see what we had to do to get the results we found with the two units CSD had selected for test last fall.

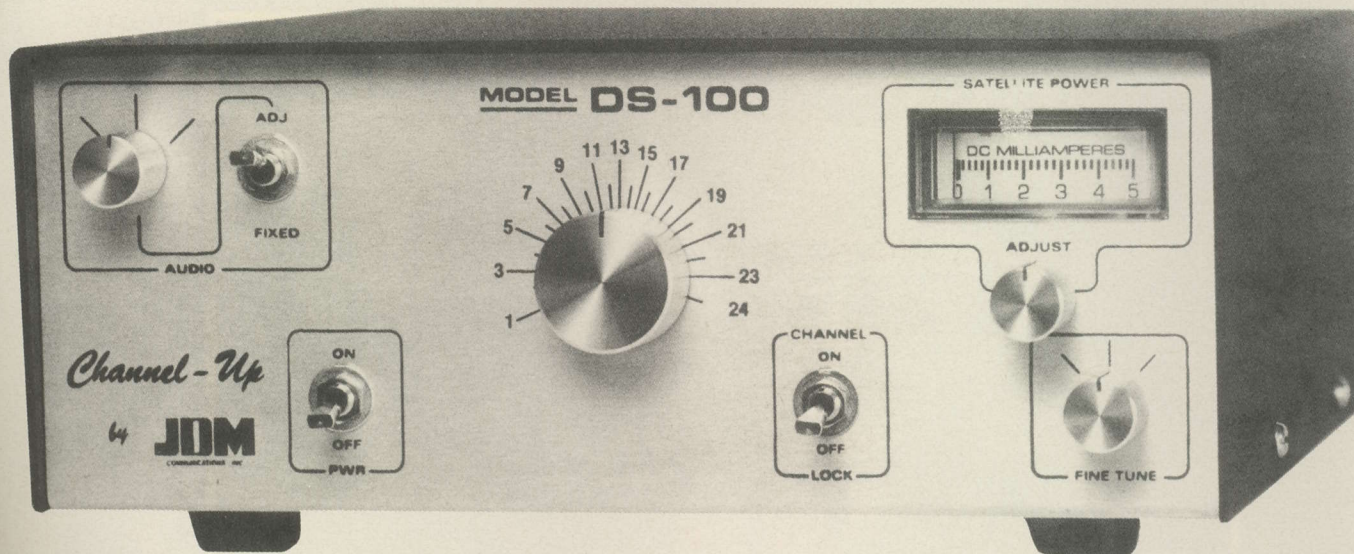
The Polarizer comes to the dealer with two foam 'caps' in place; one is inside of the feed throat end (the round end of the feed) while the other is inserted in the more rectangular opening at the back (flange) end of the feed. **Both inserts are clearly marked** with a warning **not to remove** the inserts. If you pry open the end on the feed throat, you will see a pair of gold metallic probes. Touching or moving those probes is a non-no, but not the worst mistake you could make.

On the opposite end, with the waveguide flange/rectangular opening, prying open the foam covering does instant and possibly irreparable damage. **This piece of foam actually helps secure** some very carefully adjusted sections of microwave transmission circuitry. Merely prying open the foam cover will dis-lodge the circuits and there is no way to put them back the way they left the engineering adjustment (at the factory) without approximately \$12,000 in test equipment and a fair education.

With us hovering nearby Cloutier proceeded to take a group of freshly 'field returned' Polarizer feeds to the test bench. **All bore signs**

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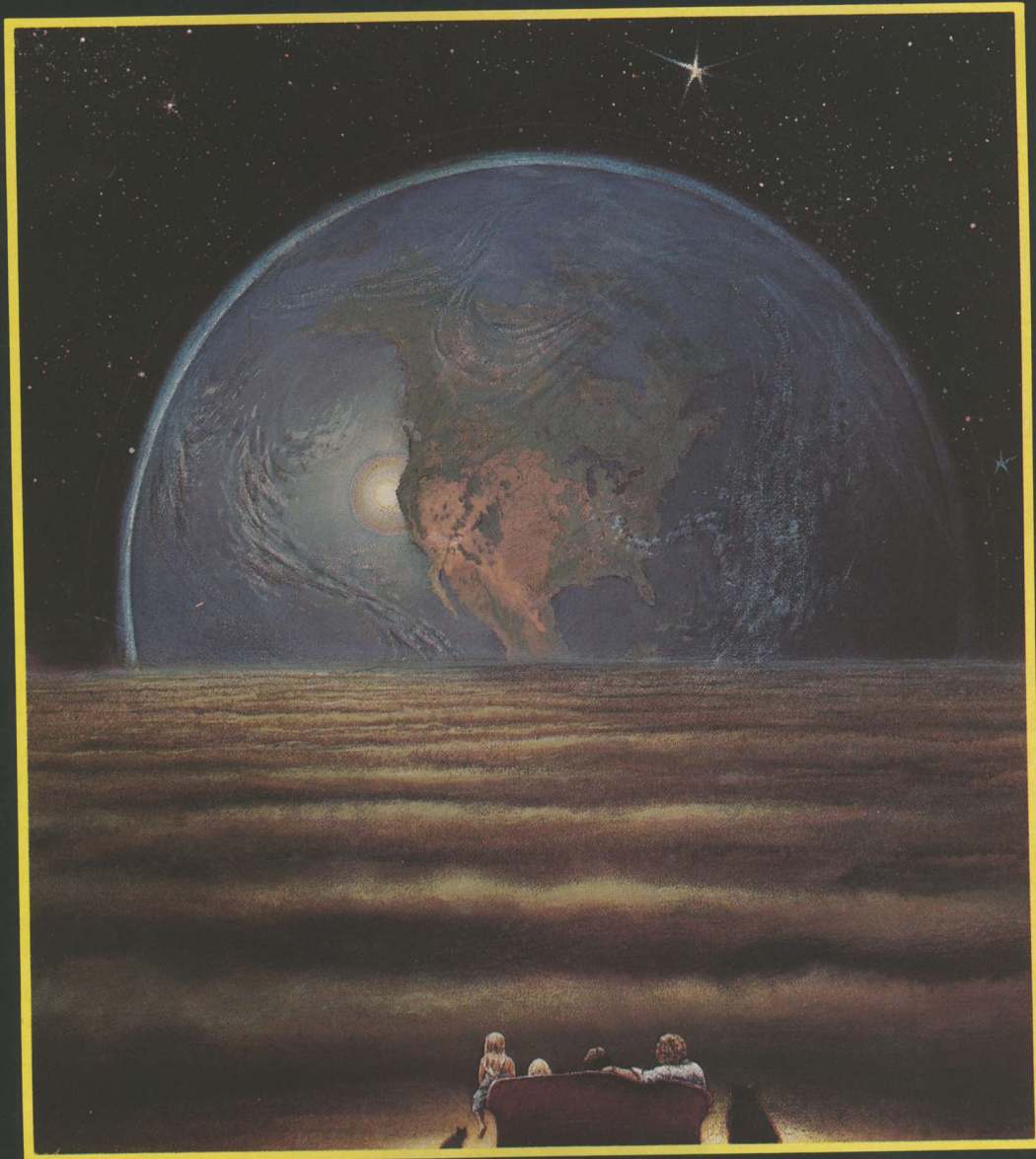
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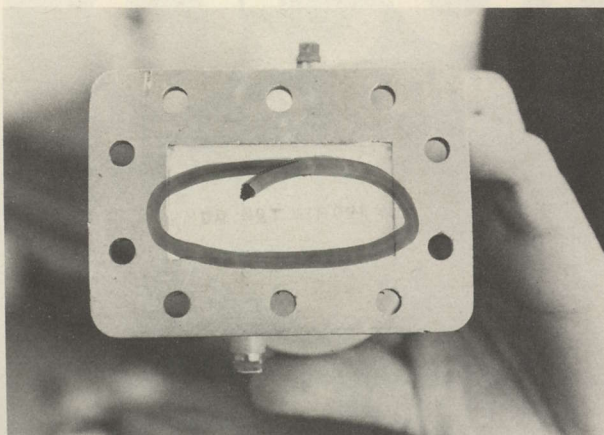
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DO NOT REMOVE/ means do not remove!

that the foam cover had been removed in the field. Cloutier muttered something about "people who would open a casket if there were screws on it . . ." and proceeded to place the first 'defective' unit on the test fixture. It had more than 1 dB of loss and a poor match. We took it apart to see why. Removing the rectangular end waveguide foam-cover, we instantly saw why; somebody, possibly using a pair of needle-nose pliers, had re-configured one of the microwave circuits. Cloutier shoved his experienced fingers up inside the cavity and went to work. First the probe-extension was straightened out, then moved a fraction (less than a 32nd) of an inch at a time. We watched the match of the feed displayed on a scope; each time he tweaked with his fingers, it got better. Pretty soon it was in excess of 20 dB in the worst case. "Fixed" he pronounced and we went on to the next one on the table.

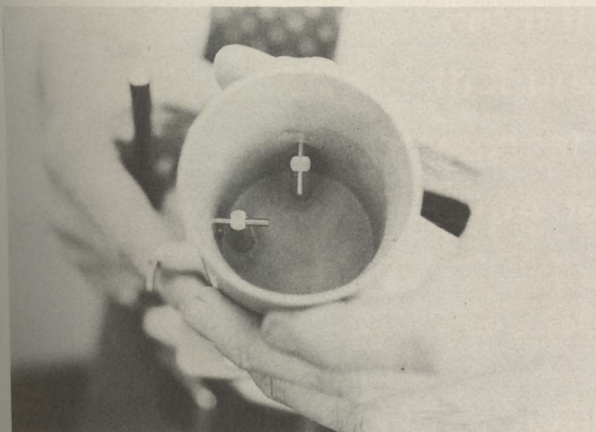
"Because so few people understand the technology here, it is not unusual to have dealers who 'tweek' trying to improve performance." Can you do this in the field, we asked?

"You could do it anytime . . . provided you have the proper test equipment and experience." **And if you lack either?**

"Assuming the unit was properly tweaked before it left here for the first time, assuming somebody did not get into the unit before it got to you, **there is nothing someone without test equipment can do to improve the performance in 'tweeking.'** Nothing at all. **They can only make it worse!**"

But suppose a unit really does act bad? Suppose it seems to have high loss or low cross-pole isolation (i.e. separation of the two polarizations). How do you fix this?

"Only in very-very rare cases by going inside of the unit. It is almost



ON THE OTHER HAND/ this is what you'll see.



22 dB RETURN LOSS (match)/ 0.25 dB through loss were typical measurements we saw on random samples tested at the Merrimack headquarters.

always an installation problem." Such as?

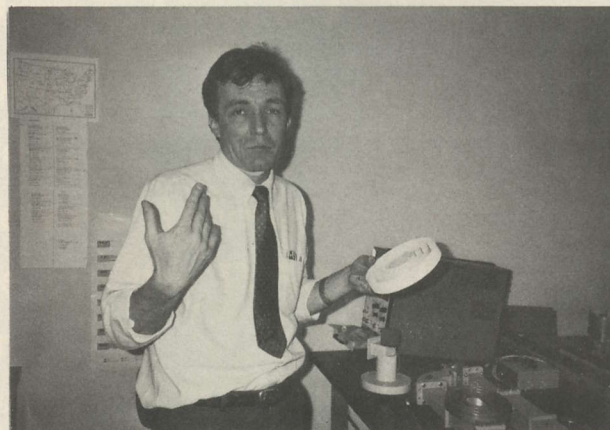
The unit **MUST** be installed properly. It must be set so that it aligns with one or the other bird polarizations, on a satellite such as F3R. It turns out that the Polarizer has a quite unique feature which falls into the best kept secret category. The individual polarity probes inside of the 'throat' are quite 'large' in diameter; one quarter inch to be exact. Cloutier suggests this accounts for an operational feature you do not find on the Chaparral Polarotor; for example.

"The Polarotor almost demands an accurate, even precise, setting of the rotational probe to cancel or null out the opposite polarity signal. The Polarizer, on the other hand, only requires a 'window' that is ± 10 degrees wide to cancel the non-desired and peak up the desired. This is why our system works without tweaking; the probe is electrically larger."

Is that an unequivocal statement; you can use the Polarizer **anyplace**, and not worry about tweaking?

"No, not at all. We have made a series of tests across North America; we have identified **at least one** geographic area where the Polarizer will not properly control cross pole signals. We simply will not sell the unit in that part of the country."

In addition to the high loss and the poor match on the Polarizer reported on in these pages, we had also experienced or studied another problem or two with the system.



CLOUTIER/ "The plastic scalar will melt, no question about it; if the feed gets in front of a non-sun dispersing surface. Omni now ships aluminum scalar (front plates) as a standard piece; plastic is still available upon request."

- 1) **Ground Loops.** In reviewing the Intersat IQ-160 receiver system this past fall, **CSD** found a '60 cycle AC problem' with the video. We understood that the Polarizer could be susceptible to AC 'ground loops' as well. How does this work?

The Polarizer obtains its switching ability with a pair of microwave diodes. Those diodes function when a voltage is applied to them. If you have a 'ground loop' it is possible to have as much as 20 volts of 'AC' floating through the cables, and feed, of the antenna. This AC voltage can, in turn, trigger the microwave diode into a '**partially-on state.**' It takes about 1.5 volts at 30 mA to make the diode fully 'turn on.' From the text, you already know that 'fully on' means 'fully off.'

But the AC floating around on the feed, created by the ground loops from an improperly grounded TVRO receiver, **can partially turn-on the diode.** A partial turn on results in a loss of signal through the diode; in effect you have the non-desired pole probe **totally** turned 'on,' and the desired-pole-probe **partially** turned 'on.' Naturally this does not make the system work very well; the feed gets the blame. The real culprit, however, is the AC voltage that flows through the antenna because the receiver has been not properly grounded through a 3 wire (**earthen ground**) AC wall outlet.

What we learned in Merrimack was that perhaps the Omni-Spectra Polarizer feed has not gotten a 'fair shake' from many in the industry, to date. Yes, there WERE problems with early units; problems which have been worked out. YES, because of inadequate instructions, many early-bird dealers were 'turned off' by the system when they couldn't get them to play properly. YES, it is possible to really screw up the performance of the unit if you pry off the foam coverings and get inside of the unit. There are no user serviceable parts inside! And unless you have considerable microwave test equipment, you have no business getting inside.

CSD obtained a pair of units for test. Neither was even close to the performance of the units we saw in Merrimack. Omni Spectra is too big a company to 'load' the tests on us; we believe the results we saw there. Our best conclusions are that we had two 'bad units.' We know that one had been tampered with before we got it; the foam caps told us that.

In a field where competitors try to 'hide' their technology, often fearful that you will figure out they have no real technology anyhow, it was very refreshing to us to have a totally open discussion and lab session with Don Cloutier and **Walter Howard** at Omni Spectra. Omni has a new field assistance program whereby any dealer who has a problem making the Omni Spectra Polarizer work to his satisfaction will get a **personal visit** from Don Cloutier, **Mark Taylor** or Bruce Smith. Now how many other products in this industry, put out by \$16M (and up) companies, will get you the **personal attention** of the factory-engineer-inventor when you cannot make it play! Can you picture Chaparral's Taylor Howard traveling to Minot because a prospective dealer can't get a Polarotor to work? You bet!

Omni-Spectra is trying hard to make a dent in the marketplace. They are far too bright a firm to be in there trying to push a product that is not competitive in performance and price to 'Brand X.' They have everything to lose, and nothing to gain by staying at it with an inferior



BRUCE SMITH/ "We shut off the engineer's penlight and turned on the broad beam of the marketing light. We found out we had been approaching the product improperly. Now in its third year, we have the Polarizer on the right track."

product. Our visit to Merrimack convinced us that the Polarizer, properly installed and properly understood by the installer, is a good working sub-system worthy of your interest. As our complex San Diego tests show, even when you **think** you know what you are doing, and you have reasonably good equipment to do it with, **you can be wrong in your conclusions.** Our initial results, reported here, was that the Omni 'line of feeds' had problems. Further investigation convinces us that the two particular feeds we tested were bad while the line itself is actually both creative and high quality in performance.

REVIEW: DRACO'S DISH MOVIN'/ CONTROL SYSTEM

A DRIVE Driven

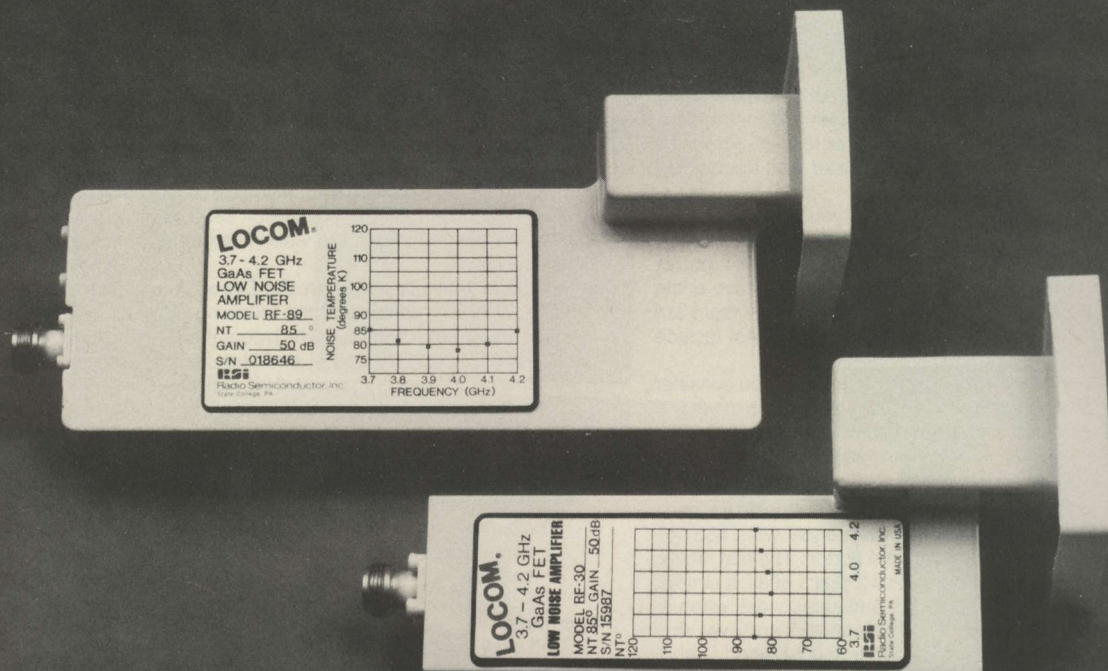
The Draco Aimer III satellite dish control system is one of the most sophisticated antenna control mechanisms in the marketplace today. It may well be the most sophisticated, and perhaps best conception of a drive and controller system available to dealers.

We first saw the Aimer series of drive(s) at the Minneapolis STTI show this past June. The proud creators and backers (*) were showing off the unit in both the operational and cut-away modes. They had all of the strong selling points down very pat and it was difficult not to be impressed as you listened to their speech and watched the drive operate. When you were invited to try to defeat the unit, make it quit or false, it became a contest between man and machine. The machine typically won.

Draco Laboratories, Inc. is one of those upper midwest electronic creations which has quiet, unassuming **Gus 'Sandy' Wirth** hovering in the background. Wirth has been in communication related businesses for approximately two decades. He pioneered nationwide CB radio system distribution in the early 60's, and saw the CB boom of

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(See Coop's Satellite Digest, Feb. 1983)

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the 70's rise and then plummet like a spent bottle rocket. Sandy has always been on the leading edge of communication system marketing and yet in spite of his deep involvement in our business and those that preceded it, he is a virtually silent figure attracting very little national attention. He likes it that way.

As a major mover of satellite hardware, Wirth has seen and studied just about every TVRO component and box that has come down the road since 1980 or so. He has made his share of mistakes by agreeing to handle products which looked great on paper, or in prototype form, but which later proved to be massive headaches for the distributor. When we talked with him in Minneapolis last June, we wondered why he and Draco were working so hard on a new motor drive. The answer of course was obvious; with limited exceptions, drives have been a particularly troublesome system part for the dealers of North America. If the controller was more or less fault-free, the power actuator was underdesigned. If the actuator was troublefree, the controller had a mind of its own.

It may be difficult to accept, particularly if you are new to this business during the last 12 months, that not much over 18 months ago a TVRO dish sold to a home owner **almost never included a motor drive**. It has only been in the last 12 months that drives have come down in price, and their impact has increased. Even today there are estimates that initial system sales in the 40% range do not include motorized drives with controllers.

Drives, and controllers, seem very expensive. When you consider that a dealer may be paying between \$400 and \$600 for a drive and control system, and less than that for his TVRO receiver, there is a natural concern that drives are still far from mature.

There are only two **basic families** of drives now available; those that move the dish as long as the operator holds the button down, and those that move the dish from where it is to where you want it to be, after the operator pushes **and then releases** a button. The first family of drives has no memory, and possibly no electronics at all; it simply goes east when an 'east button' is pushed, and 'goes west' when a west button is pushed, driving the dish through the arc over the equator. A slightly more sophisticated version of this basic drive and control system would include 'limit switches' so that as the drive approaches its own 'safe limits,' at the end of safe travel in either direction, the 'limits' shut down the motor circuits even if a forgetful operator has left his finger down on the button too long. 'Limits' came along after too many people kept the button down as the dish spun into the ground or mounting hardware, or clear out of its actuator shaft drive.

This type of drive remains available today, and sells very well with lower priced home TVRO systems. It does, in fact, make the perfect 'step-up' add-on-sale device for people who tip-toe into the TVRO world with their hand firmly clasped over their pocketbook. And as long as the user has reasonable savvy, can recognize one bird from another as the dish moves through the sky, and doesn't mind holding a button down while the dish moves, this is not a bad way to go. Drives in this family may wholesale to the dealer in the \$300 region.

It is the next-up family which interests us here. These are the drives which replace the simplistic 'east button' and 'west button' with a set of controlling circuits; circuits which read where the dish is at any instant, circuits which memorize where the dish is or was when the operator wants to return to a specific satellite position, circuits which control not only the dish and the drive but often the Polarator or other feed switching system as well.

These are the automatic dish drives which have some sort of push button or key board 'entry' system. The controller works directly with a

'counter' of some sort and the counter monitors the drive mechanism. If the drive uses a form of 'jack screw,' the jack screw turns on its own axis when power is applied. When power is applied to the jack screw drive motor in one direction, the jack screw rotates on its axis in a clockwise direction. When power is applied to the motor in the opposite direction, the jack screw reverses and turns on its own axis in a counter-clockwise direction. Jack screws are designed to extend their length or retract their length, between two set limits. When the jack screw extends (gets longer) the end of the jack screw pushes against the dish proper and shoves it 'up' in the sky towards higher and higher (or, lower and lower) look-angle birds. When the jack screw retracts, the dish is 'pulled' downward towards the ground, and towards lower and lower (or, higher and higher) look angle birds. As it travels in this semi-circular type arc, the dish works on the polar mount and tracks through the sky and the Clarke Orbit Belt.

All of that seems pretty elementary and not overly complicated. And, as some have pointed out, "If you can buy a computer controlled medium sized refrigerator-freezer for \$500 retail, why does a dish 'mover' cost as much or more when it is but a fraction of the size or complexity?"

Perhaps there is a clue in the Draco Aimer III.

The AIMER III consists of the following basic sections:

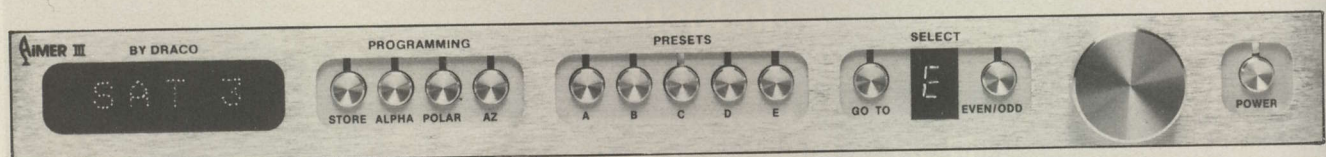
- 1) **The Aimer III chassis**, which contains all of the electronics and which, pound for pound and inch for inch is actually heavier than and larger than many of the TVRO receivers in the marketplace.
- 2) **The motorized Power Actuator**, which attaches to the dish and upon receiving 'electronic commands' from the Aimer III chassis, moves the dish where the user has instructed.
- 3) **A Gimbal Bracket**. This is a mechanical device which helps the drive power actuator attach to the dish, and eliminates something undesirable called 'side loading,' or torque. We'll see why.

Confused?

The designers of the Aimer III wisely recognize that not everyone who encounters the unit will 'feel comfortable' with operating such a space-agy system. Way up front in their manual, they tell the user "... if you get confused, just stand back and wait." What they are saying is that on purpose, by design, the system requires the user to do 'two things' (i.e. push two buttons) in some particular sequence, and within a pre-programmed period of time, before anything will happen. This wisdom gets the user around accidental activation of the dish drive. It is one thing to 'hit' one button and then wish you had not touched it; it is quite another to 'hit' two, in a row and within a prescribed time frame. Such is the overall wisdom that has gone into the unit's functions.

Let's review what the Aimer III is capable of doing.

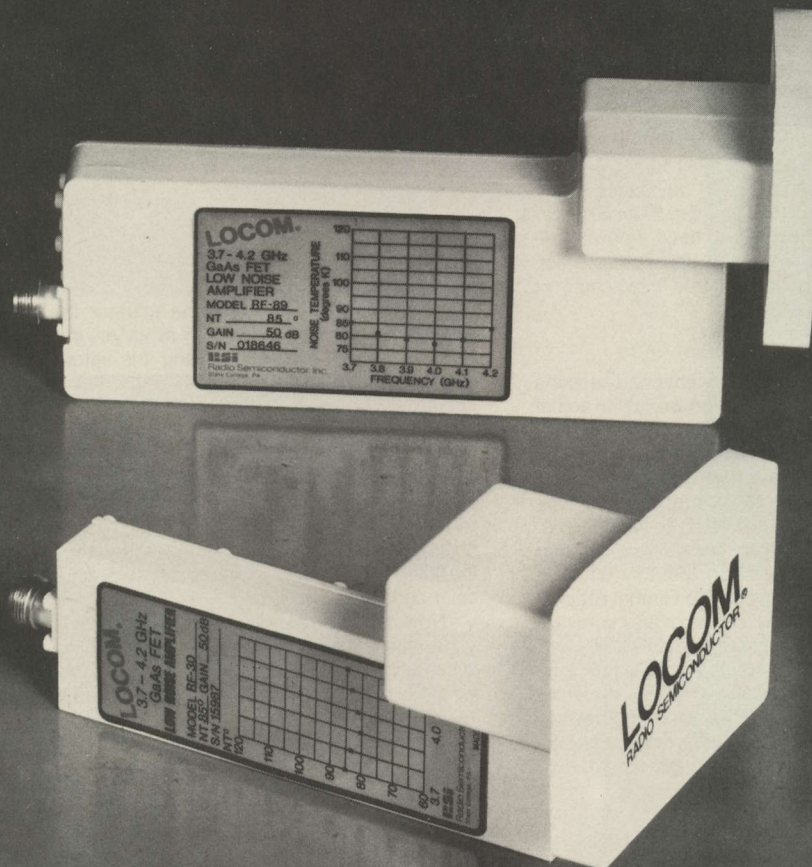
- 1) **It tells the user** which satellite he is tuned to, or selecting. This is done with a four digit display on the front-left hand side of the indoor unit.
- 2) **It stores in memory** the location of as many as 64 satellites (a touch of overkill, but what the heck) and gives the user the ability to select any five of those satellites for 'instant recall.'
- 3) **It directs the polarization control system** (i.e. Polarator I) to the proper polarization 'sequence' for any bird you have in memory (remember, there can be 64!).
- 4) It has the ability to do several 'special things' which might appeal to some of your customers. Examples:
 - A) **The system can be set** to 'lock out' particular satellites. In



DRACO AIMER III call letter (satellite nomenclature) digital call out display.

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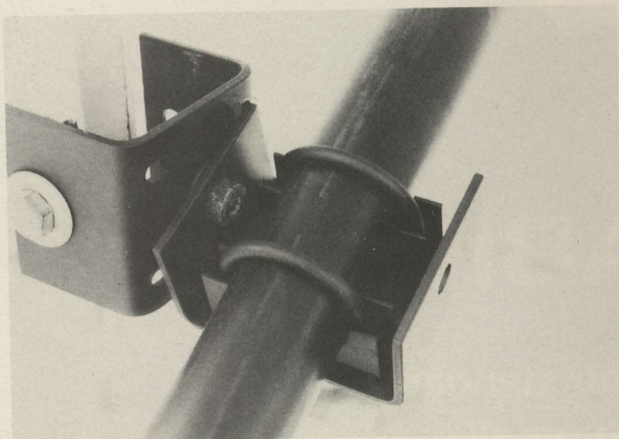
this way you can leave home for the evening and insure that the kids don't wander over to F4.

- B) **You can lock the satellite terminal into a fixed position;** for example F3R. This insures that nobody messes around with your dish when you are not home (alternately, you can lock it 'between satellites' so that the terminal appears to be inoperative).
- C) **You can take away** a stored position from the memory. And just in case you have a change of heart, you can 'recall the last satellite deleted' and put it back into memory hours, days or weeks later!
- D) **You can re-align your dish** without touching the dish. Within reason of course. Let's say your polar mounted dish moves ever so slightly on the round polar mount tube. Everything seems off a tad. The user has two choices; get the dish back where it is supposed to be, or create an 'Aimer III fix' from inside. There are limits to this, naturally.
- 5) **There is memory-battery-backup.** If you have a power failure, all of that carefully entered-into-memory data could be lost. The battery will hold onto what you have stored in the chips for up to 100 hours.

HOW Does It Install?

The dealer receives all three of the previously mentioned sections plus 125 feet of cable (connectors one end, an Allen wrench to adjust the Gimbal Bracket and six special 'splicing connectors' that allow you to hook up the outdoor portion, at the dish, without any tools.

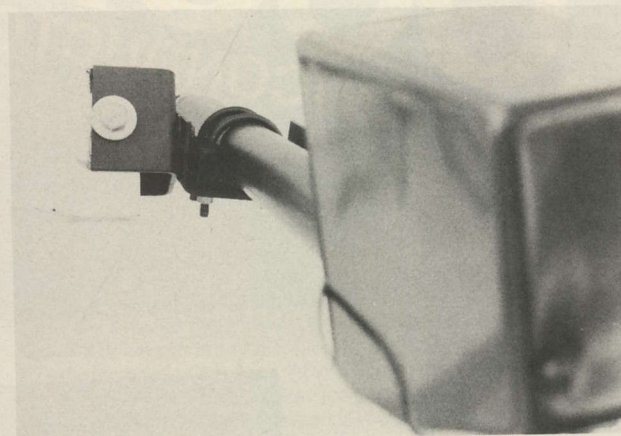
Gimbal Bracket. Dish drives have always had 'torque problems.' The dish does not always want to cooperate; it drops to low look angles in one extreme and it is way up there at the high look angles. The resistance of the dish, to move properly, varies depending upon where the dish happens to be. This places considerably different 'loads' on the drive itself at different look angles. The Gimbal Bracket corrects this; it forces the drive to always see a more or less constant 'load' and the net result is that the drive does not have to huff and puff at low look angles and then sail off in high speed at the higher look angles. The 'GB' attaches to the dish's rear frame as a 'central support' to the drive itself. In addition to being a wise engineering move, the 'GB' is well thought out with adjustments the dealer can make at the time of installation to cope with virtually any type of dish structure.



AIMER III GIMBAL Bracket pivots on itself to insure that the dish is always driven 'true' without binding, or, unusual torque on the drive system.

Note: The dealer may have to drill a hole (1/2" diameter) in the dish back frame to mount the 'GB.' **Not all dishes come with a hole**, of this size, in the proper position.

The Actuator. The power actuator attaches to the dish at two points. One of these is the dish itself, usually to a rear dish strut on the (metal) frame. The other attachment point is the Gimbal bracket, which doubles as both a rear **and** a central attachment point. You do



one clever thing as you attach the actuator; the inner extension tube is rotated one turn away from 'fully in' as you install. What does this do? Set the 'IN' limit for the drive and it is automatically reflected in the electronics console inside. We'll deal with setting the 'OUT' limit separately.

The factory provided cable is routed from inside to the dish. A stub of cable hangs from the motor portion of the actuator. Your assignment is to get the two together. Draco makes it easy, providing a special non-strip, pliers-only splicing connector. You insert the two wire ends into the connector, and snap it together with pliers. No fuss, no bother although we would suggest you **then apply** Coax-Seal over the fitting to insure that moisture never-ever gets inside. The wires are color coded.

Now, the cable supplied is good for a 125 foot run. You can use the same type and gauge of wire (4 #22, 2 #16) for runs up to 250 feet. By substituting larger gauge wire for the 'pair' (#22 is fine for longer runs for the quad set since it only carries control signals), runs to at least 1,000 feet are possible.

The electronics. It will bother some that while the motor is attached to the electronics, you do not connect up the Polarotor **at this** time. We'll see why. Indoors, the factory supplied cable has 'keyed molex' plugs. It is possible, but difficult, to screw this one up. Just in case you do:

- A) The word '**Fuse**' pops up on the actuator display. This can mean that you have the wires crossed, or the plug inserted improperly. It can also mean that you have blown a fuse!

Thanks to the battery back up in the system, you not only do not lose memory, but you also do not lose instructions should something go. As we shall further see, the Aimer III is filled with user instructions.

Oh yes, you do not plug the Aimer III into a 'switched' AC outlet (the kind that some people insist on installing so they can turn on and off floor lamps when they enter or leave a room). The unit wants to see 'power' all of the time to insure that the Nicad battery stays charged should power 'really fail.' Remember the battery keeps the memory going.

Set up of the Aimer III seems very complicated at first blush. Fortunately, it is not complicated. In fact, unlike many of the dish moving systems on the market today, it is quite a bit of fun. We'll hit the highlights just to illustrate what is involved and let you try it out on your own in person.

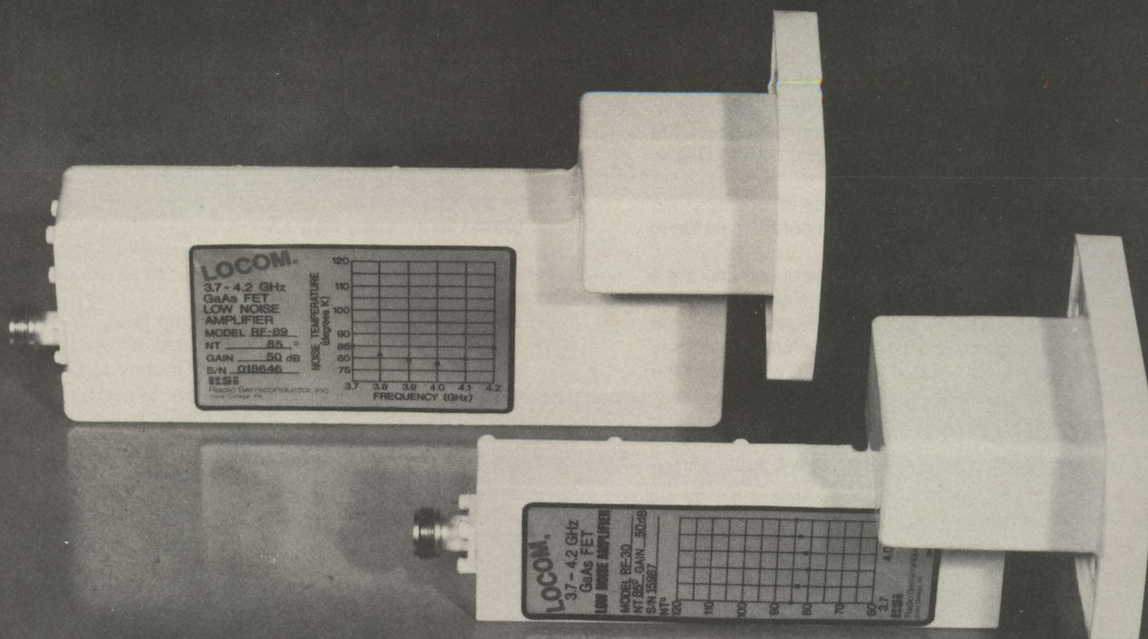
- 1) **The 'IN' limit was set at the dish** (remember the one-full-turn). The 'OUT' is set by operating the dish in a manual drive mode (in spite of all of the memory and automatic features, the dish can still be switch operated in a manual mode). The dish is run to just east of the last satellite (F4 for most of us). With the dish in this position, two buttons ('Store,' and a special set and forget button) are pushed. That does it; the dish now has both extremes set and you cannot go past those points.

How do you know it took? Those clever Draco engineers have the box tell you, on the display; 'OUT.'

Now the Polarotor cable. It has three wires. The Draco cables are color-coded to match the Chaparral wires; red, black and white. The

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only caution here is that you have to make a real splice in the two sets, and protect the splice afterwards with Coax-Seal or something equally as good. It would not do for any of these wires to short together since permanent damage to either / or the Aimer III controller / Polarotor can result.

- 2) **The satellite is found using the manual controls.** When the signal is peaked on the satellite receiver (using the meter or your eye), the location is 'stored' by simply pushing on the 'Store' button. Having peaked the satellite's location and stored that location into memory, you then set the polarization memory for the satellite. That lets you mix and match Westar/Galaxy odd-horizontal and even-verticals with the opposite format of Satcom and Comstar birds so that as the user recalls birds from memory, he ends up with everything pre-set. Pretty neat.

The last step for each satellite is to dial up the 4 character/number designation. There is a knob you turn and from left to right you find the correct digital read out character for each of the four positions. You can spell out SAT 4 or anything you wish. Most people can think of their own clever, four letter or number combos that are unique if that turns them on (**contest** entries for SAT 4 should go directly to Draco; **not CSD!**).

You repeat the sequence for each satellite. They all end up in the 'Main Menu' which is the 64 satellite memory. You recall the satellite of interest in one of two ways:

- 1) **You turn what they call the 'Alpha Dial'** until you find the 4 digits that describe that satellite. Then you set the odd/even polarization button (the digital display says E and O, which is self explanatory) and hit the 'Go To' button. Before you can say 'Playboy' you have the dish locked where you want it and the polarotor already set.
- 2) **Or, you have something called 'Presets.'** There are five buttons for the most-used satellites. The pre-set buttons recall not only the actuator's position but also the correct polarization for that bird. If 'A' is Galaxy 1 and you want Galaxy 1, just hit the 'A' button followed by 'Go To' (there's that two-button fail-safe sequence again).

There are a couple of features here which escape casual observation. Not all birds have the same required polarization 'skew'; F3R, for example, is 'cocked' 10 degrees (more or less) off of true alignment, and when you switch to F3R from neighboring D4, for example, where the odds and verticals align channel for channel, you will find on most systems that you have to touch up the polarization control to compensate for that 10 degree 'cock.' With the Draco Aimer III, you adjust the polarization where it is best for each bird and the memory remembers that F3R is 'cocked' 10 degrees. No more screwing around with fine tuning the polarization.

REALIGNMENT

We mentioned that one of the hidden features was the ability to realign the whole system if the dish has twisted on the polar mount. Actually, that is a mis-nomer since as any dealer worth his salt knows, if you corkscrew the dish on the polar mount pipe or mount stand, **you lose tracking.** Getting the dish's elevation arm true north and south is important to tracking, and if the whole thing twists on its center, you lose that ability.

Having said that, it is possible nonetheless to get slightly off, for whatever reason, and to bring it back with the Aimer III. Normally, you would go out and re-align the dish to true north and south. This is still the right way to do it, but a **temporary** fix of sorts can be done by simply dialing up any bird in the belt, noting that you are off slightly, and then moving the dish with the manual control to repeak the signal. Having done this, you go through a three-button exercise. Having pushed all three, the memory location for **ALL birds** in memory has now shifted to compensate for the dish that moved. This can get you as a dealer off the hook in the middle of a Sunday afternoon (the customer can do this himself) and get the customer back in 'peak service' until you can schedule a service call to properly realign the dish mechanically. When you do this, you can re-shift the memory for ALL satellites back with the same three button exercise.

COMMENTS

Not every dealer wants or needs, or can use, a stand-alone super

memory dish moving system. Many are already wed to systems which integrate with their receiver packages. There may even be a conflict between your dish receiver electronics and the Aimer III as far as the Polarotor control is involved (many receivers now toggle the Polarotor for you). The smart thing to do, if you are selling receivers which attempt to marry to the polarization control system, might be to forget about the receiver's control circuits and install the system to the Draco since it has far better controls plus memory.

The package is extremely well done, and between its introduction in Minneapolis in June and now, most (if indeed not all) of the bugs should have been worked out.

We have used a pair of these drives in a high humidity and salt spray environment for several months. **We have had no failures,** have never seen the word 'Fuse' appear on our digital displays, and have purposefully allowed one to be used by a technical type and another to be used by an average consumer who frankly has a hard time turning his TV set on and off.

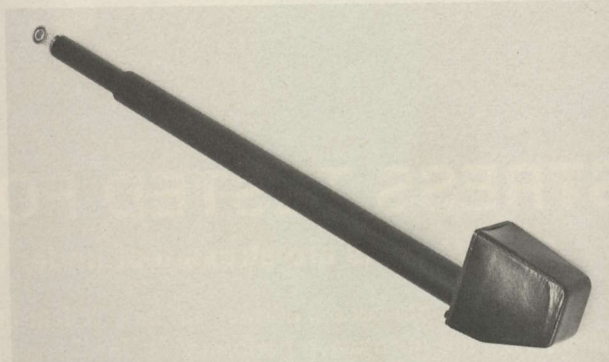
The package is frightening to the new dealer because it 'seems' to be complex. That fright quickly passes, however, when you sit down with the excellent step by step manual and simply install it step by step. The manual is so complete that it does two things:

- 1) Its **detail** may actually frighten people who are **not accustomed to** so many instructions, and,
- 2) When you do get into trouble, the answer IS there.

In particular, a rear section on trouble shooting seems to cover just about every aspect of the operation.

So what are the down side aspects of the product?

- 1) It costs a fair piece of change, but in all honesty it is far from overpriced. You have to pay good money to get this much electronics and mechanics to be fail safe **and** operator proof.
- 2) And, purely as a personal observation, the electronics portion of the box may be a tad on the 'electronic-look' side. It is obvious an engineer designed every part; a good engineer. What we end up with is a controller which probably looks more complicated than the customer's satellite receiver. That may frighten some customers who are barely able to cope with their light switches.



- 3) **And one brief shot at the manual.** You will probably leave this with the customer. He may even read it (but not likely). In the two manuals we received, there is no information anyplace that tells you the address of Draco (they might as well be located in China as far as the customer can tell from the manual), how to get ahold of them if there is such a need, **and most important,** what the warranty and guarantee policy might be. If the customer is 'shy' about the complex 'look' of the product, and the dealer needs to reassure the customer that the Aimer III will not be a service problem, it would be helpful if the manual which the customer will receive had a clearly stated warranty and return policy included.

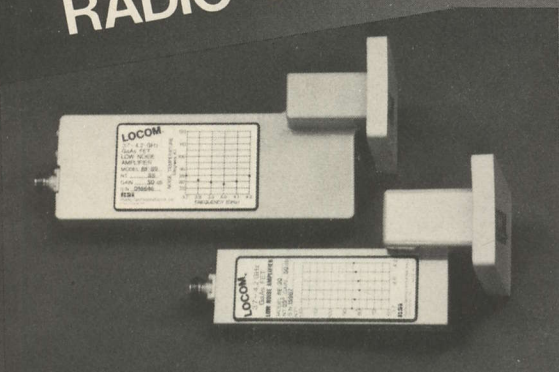
Drives have come a long ways since the first simple east and west switches sent dishes tracking across an uncertain, and largely empty, Clarke Orbit belt. Draco's Aimer III is one of the latest, and it deserves close study by dealers who are looking for the 'ultimate system.'

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REVIEW: HERO 13' DOMESTIC DISH PACKAGE

TRANSPLANTING A Foreign Product

For more than a year now **Hero Communications** (2470 W. 8th Avenue, Hialeah, FL 33010; 305/887-3203) has been pretty much avoiding the 'domestic' US or North American TVRO market, concentrating instead on providing massive 6, 7.5 and 10 meter structures to buyers in the Middle East, the far regions of the Caribbean, Central and South America. Hero pretty much has the off-shore market sewn up, although others such as ADM have sold their share of 'big antennas' outside of the USA.

During that period there have been two new antenna models (the 7.5 and 10 meter) as well as subtle refinement of their smaller versions. The refinements have generally resulted in improved performance as well as better durability in what are often hostile climates. During that same year Hero moved into new, far larger, quarters in South Florida and they now have the capacity, internally, to turn out perhaps as many as 3,000 antennas per month. It should come as no surprise to you to learn that the off-shore market has not yet reached proportions where 3,000 antennas per month could be consumed, even if Hero had 100% of that marketplace. With the capacity, and staff in place; with another year of field experience under their belts, Hero has now decided **it wants a share** of the domestic US market. Their target antenna size region will be the 10 to 13 foot class, neatly bracketed by one each model in the 10 foot and 13 foot class.

Hero possibly pioneered screen mesh dishes; certainly they were among the first if not the first. Subsequent arrivals in the marketplace have refined the product using various mechanical approaches to designing antennas which 'snap together' or go together without any elaborate tools or skills. Hero antennas still pretty much go together in the 'good, old fashioned,' time proven method of firmly attaching each piece of screen to its support members with metal screws. New tooling, new 'tools' make it possible for the dealer assembling these antennas to do two things at once; drill the hole **and** install the screw all in one motion with a single, customized screw that also doubles as a 'drill bit.' This greatly speeds up the screen mesh attaching process since this eliminates first drilling a hole, then fumbling for a metal screw to insert into the hole and tighten down. The hand held 1/4 or 3/8 inch drill does both jobs at one time.

With in-resident operating antennas in the 12 foot class, Hero elected to bring their 13 foot model antenna to Providenciales for a side by side test. The direct competition would be a Paracclipse 12 footer and a USS 12.5 footer. The Paracclipse is another of the screen mesh design antennas while the USS is a fiberglass two piece antenna. We have previously reported on both, here, and we found the USS antenna to be approximately 0.75 dB better than the Paracclipse antenna; all electronics being equal.

The Hero antennas have elected to follow the Taylor Howard doctrine of antenna feeds; selecting a **0.3 f/D feed system** (the Chaparral feed with the .3 ring, and Polarotor device). This is not surprising since Howard functions as consultant to Hero on both its antenna designs and many of its outside projects.

The **Hero 13 footer** is by many home standards an 'overpowering antenna.' The **present** version is not anodized which leaves the raw-aluminum look. Aluminum does shine in the sun and the antenna is a



PROFILE OF 13 footer is someplace between large and large. Whether the same antenna, in 10 foot size, would be less 'obtrusive' will depend upon buyer reaction.

focal point of attraction wherever it is installed. There may be something 'magic' about antenna size, as well; a 12 footer has a certain 'size' to it while a 13 footer next door just naturally seems to be considerably larger than its 12 foot neighbor.

Hero utilizes 24 struts/mounting sections per antenna. Hero believes that an antenna must have an accurate surface if it is to perform properly, and one way to maintain an accurate surface is to use lots of metal behind the reflecting medium; i.e. the screen mesh. Many other antennas offered in the 12 to 13 foot class use far fewer struts to support the mesh, and unless they 'compensate' for fewer struts by running circular supports in rings, **as Paracclipse does**, there is no real way to maintain the surface accuracy and insure that the dish will be an efficient reflector at 4 GHz.

One of the penalties for this number of struts is that you have to spend some time mounting the struts. We timed the complete assembly process, starting from opening the box and ending with setting the completed antenna on top of the pipe mount in the test yard. The two-man crew that did the assembly, with Hero's Bob Behar hovering nearby, is the same crew that installs antennas throughout the islands and they have considerable familiarity with the process.

Our first comparison.

- 1) **A 12 foot Paracclipse** requires around **4 hours** for two men to assemble and have ready to look for people pictures;
- 2) **A 12 foot USS** (two piece fiberglass) requires around **three hours** for two men to assemble and have ready for pictures, **although** you need two additional men or a lift device to set the completed dish proper onto the mount at that critical point;
- 3) **A 12 foot Conifer** requires two men **under three hours** to assemble and have ready for pictures;
- 4) **An 11 (or 13) foot ADM**, using the new both-ways-contoured

TVRO FROM THE ALL-AMERICAN COMPANY

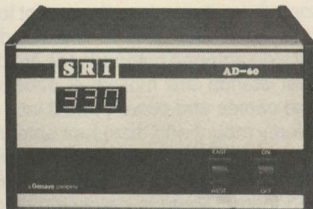


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- panels, **requires 3.5 hours** to have ready for pictures;
 5) **The 13 foot Hero** screen mesh antenna required **4.5 hours** to get to the same point.

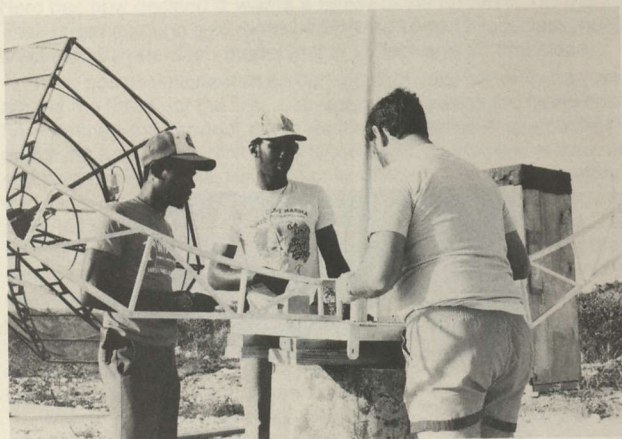
Undoubtedly, a professional crew that only assembled one type of antenna and who did the same thing each day could shave some time off of **all** of these numbers.

The installation of the mesh surface, using the new screws that double as drill bits, is far faster than the old approach that required separate drilling, and, screw insertion. What we lost in mounting the struts (in time) we more than made up with the assembly of the mesh. There is an almost direct comparison here between the popular Paraclipse and the Hero; the Clipse **support structure** goes together in about the same time the Hero **mesh** goes on; and vice versa. Any extra time that is associated with the Hero comes from final dealer assembly of the motor drive system; a horizon to horizon drive.

Hero's approach to antenna systems has always been to include their own in-house-designed chain drives. The chain drive system is now used by a number of other antenna suppliers as well; even the new 16 foot Paraclipse 'international grade' antenna uses a similar system. And while it is possible to purchase a Hero antenna and provide your own motor drive, the antenna is created at the factory for their own horizon to horizon drive.

As recently as this past summer, a jack screw or other 'linear drive' approach utilizing a push/pull system was deemed adequate by the majority of the marketplace. With a jack screw drive you could hit all of the satellites from F3R to F4; although in truth, you may not have much edge room remaining on one or both ends if you were in the southeastern part of the country, or, the far west. That was before F1R came on line, and prior to the recently launched F2R bird which have pushed the active orbit belt more than ten degrees overall. With Galaxy 1 and G2 now coming on line, and additional new satellites scheduled for the eastern end of the belt, **there is a growing interest** in having full access to **all of the satellites**. To date, nobody in the 'linear actuator' marketplace seems to have gotten a proper handle on this relatively new problem. Hero's horizon to horizon drive (*) has no such problem; the antenna will go down to approximately an 8 degree look angle on one side and a 6 degree look angle on the other; **stock**.

The factory version of the Hero 13 footer includes a welded steel



HOVERING like a 'Mother Hen,' Hero's Bob Behar kept a close eye on the assembly process for the test 13 footer on Providenciales. Rib installation consumes the largest single block of time.

* / A **true** horizon to horizon drive would allow the antenna to come down to a **0 degree**, or flat-out-to-the-horizon, look angle on **both** sides. There are apparently no such drives actually available in either the home nor commercial field, although a handful of Intelsat installations have been custom designed for this application. Most horizon to horizon drives stop short of the horizon on one, or both sides; perhaps by as much as 20 degrees. If you have **low** look angles, you should **always check** with the supplier **before** making the assumption that the dish will drive 'low enough' to suit your location.



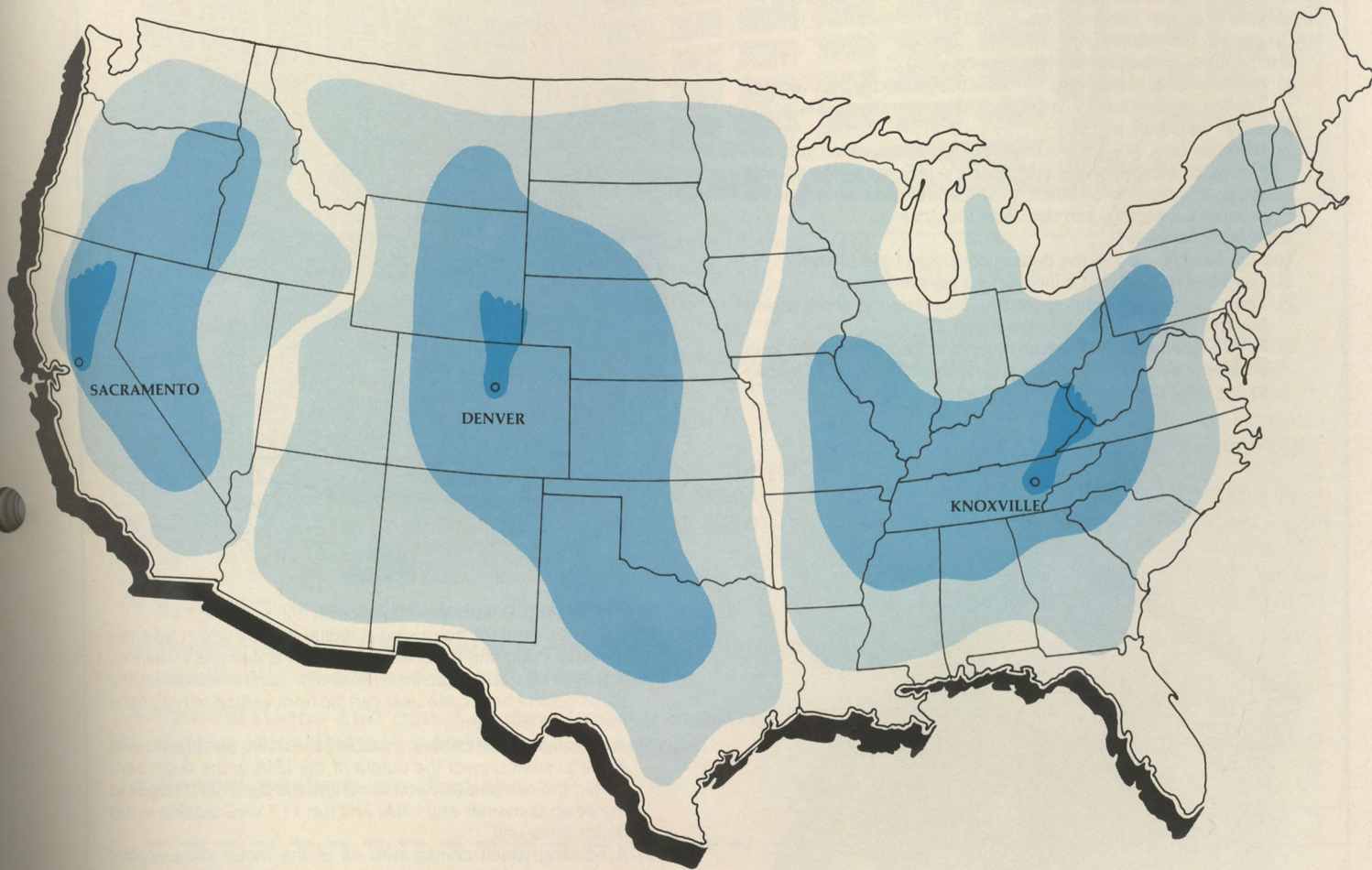
SCREEN MESH goes on quickly and easily, using newly developed tools and combination screws/drill bits. Even the last piece lays in place with no difficulty; you simply 'roll it out' as you leave the hub area of the dish, and tack it down as you go.

mount which gives you the support needed for a surface of this size. In the interest of saving freight costs, we elected to leave the mount at the factory and transport the antenna less the mount to the Turks and Caicos Islands. We happen to have several 'test stands' at one of the facilities where side by side antenna comparisons are carried out on a routine basis. The test stands are individual pads with their own dedicated underground cables and power, and 3 inch diameter steel pipe mounts. We routinely mount and dismount antennas from these pipe stands for test purposes. In all honesty, the 3 inch steel pipe **which we use** for test stands would not make an adequate full-time support for the Hero 13 footer. There is simply too much of a load on the pipe, at the top, with the considerable wind surface area.

There has been an **often-repeated** tale for years, within the industry, that a screen mesh surface offers a lower wind resistance **only up to** wind speeds in the mid-30's region. According to this 'intelligence,' after between 35 and 40 miles per hour, vortexes created by the wind striking the mesh surface and 'shearing' off at an angle tended to 'fill in' the screen mesh surface area, resulting in the equivalent to a solid surface at speeds much beyond 40 miles per hour. That seemed like a logical extension of high school or college physics to us, and we are as guilty as anyone else in repeating that 'tale.' Recent tests, conducted by Paraclipse using their famous 'wind machine,' suggest such 'facts' are totally incorrect. In the Paraclipse tests, the wind speed, using the wind generators, was cranked ever upward. The wind speed was measured both on the front or leading edge surface of the dish **and directly behind the surface**. What those tests revealed was that when a 75 mph wind hit the **front** of the dish, there were still winds of nearly 72 miles per hour **behind** the dish. No, the dish surface did not 'close up' and thus the screen mesh

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continued to be a pass-through surface even when there was a strong wind blowing.

If you believed the first 'tale,' then you were ready for the second 'tale.' And that is that between 35 and 40 miles per hour, those screen mesh surface dishes which use 'channels' to grip the screen mesh often allow the screen mesh to 'pop out.' In other words, above a certain wind speed (where the first tale told us the mesh surface becomes 'solid' to the wind), the not-secured panel sections simply 'fly loose' and head off across the yard. None of this has anything directly to do with the Hero 13 footer, since it uses a very rigid sheet metal screw tie down for its panel sections (24 in all), but since we were on the subject of screen mesh dishes, it seemed like as good a time as any to correct the record!

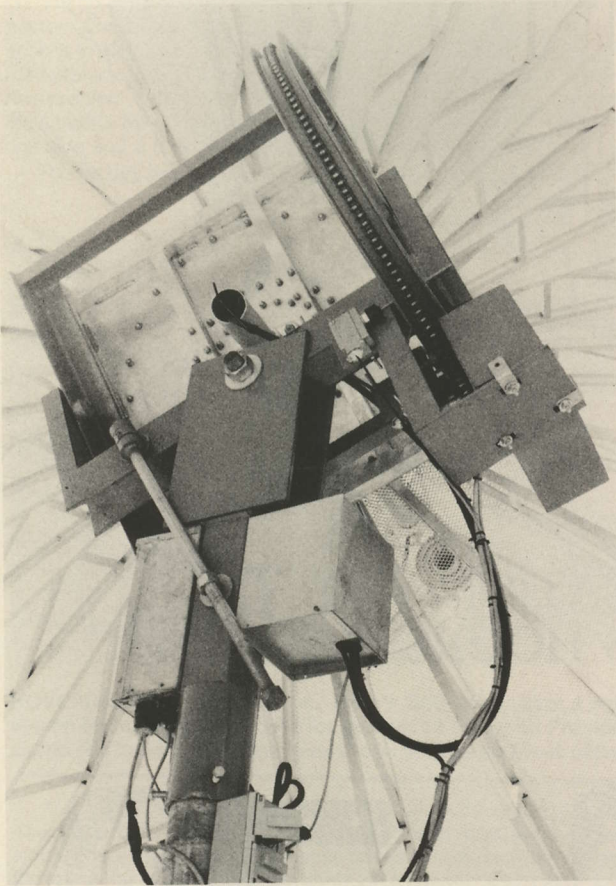
The problem presented to Hero was two-fold:

- 1) **Number one**, is the Hero 13 footer a high efficiency antenna? Testing, against competition with known operational characteristics, would tell us.
- 2) **Number two**, how do you transfer a product which was designed for off-shore consumption to the U.S. marketplace, and get a share of the domestic U.S. Market? Fine tuning of the product packaging, perhaps, was the answer.

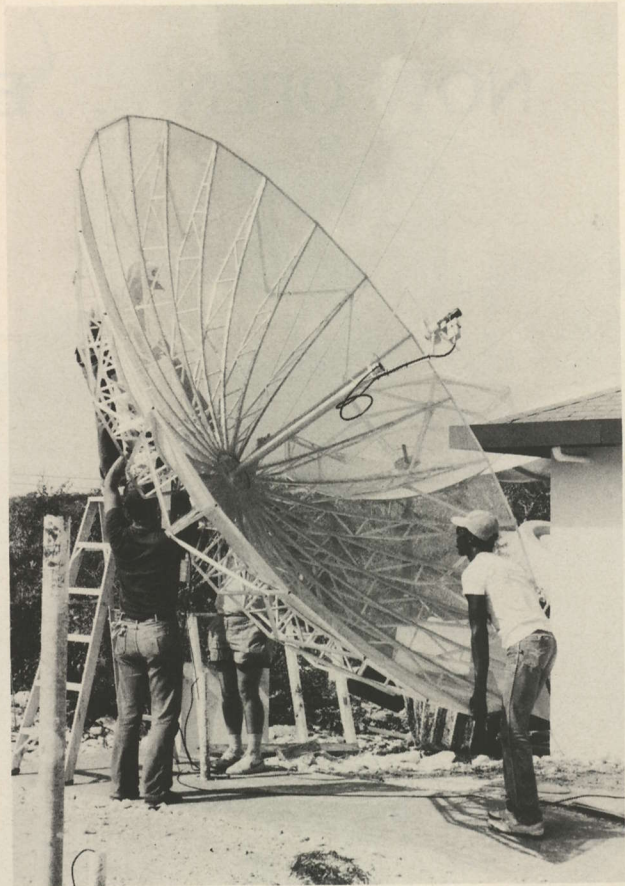
The performance first.

The full system, sold to the dealer, consists of the following:

- 1) The steel **mount** that attaches to a concrete base;
- 2) The complete **antenna** assembly, including the chain driven horizon to horizon mount, and motor;
- 3) A .3 f/D **feed** assembly which mounts in the center of the 'hub plate' and extends out from that plate approximately 47 inches to the focal point;



POST MOUNTING equipment box contains all drive control circuits as well as down converter housing space and a host of dealer-directed check points. All cables are prepared by Hero, ready to plug in at both ends.



- 4) A Chaparral **Polarotor** (2) system;
- 5) An inside **control box** using a digital display which tells you between 0000 and 9999 where the dish is pointing in the sky. There is also a two position Polarotor control switch on the same control box so the user can flip from vertical to horizontal (or stop in between).
- 6) A complete **set of cables**, including the 214 type large coaxial cable to interconnect the output of the LNA to the down converter; the cables allow you to control the dish, send power to the down converter and LNA, and run 117 VAC outside to the motor drive unit.
- 7) A housing which comes with all of the motor drive control circuits and electronics already mounted; room is provided inside to mount the down converter as well.

What Hero has tried to do is to pack everything the dealer needs into the twin cartons; including a special adapter tool for your hand drill so you can use the special sheet metal screws that double as drill bits in fastening the screen mesh to the struts. In this respect, the package has been extremely well thought out and the dealer should require nothing but a hand drill and a couple of wrenches to turn the two cartons into a working antenna system.

The dish mount is 'polar' which means that you initially set the declination with an inclinometer to your required 'offset' for your latitude. Then you do a rough alignment of the dish, with the motor, towards the spot where the highest satellite in your sky should be. Now you spin the antenna back and forth on its pole-attachment mount until you find pictures. From that point forward is an exercise in working back and forth between the low look angle birds (G1 or F1R), tweaking on the north-south (or polar-rotational) adjustment, and, the high look angle birds (F4 or F2R) tweaking on the elevation adjustment.

This may require anyplace from 15 minutes to an hour's time; depending upon how many times you have done this previously, and how much you need to get that last 1/4 dB out of the sky. Because this

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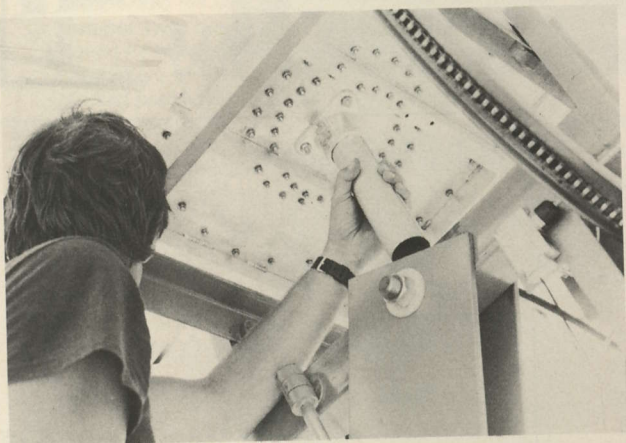
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is a horizon to horizon drive, you have a much wider arc to 'attach' to. You can be quite happy with the birds between F4 and F1R, for example, and be done in say 30 minutes. Or, if you get that far in 30 minutes, you may find (as we did) that it required another 30 minutes to have the dish tracking **just as well** from F4 (nearly straight up for us) **on east** to Ghorizont at 14 west. Yes, even from the United States, you can tune in some of the stronger international grade satellites with this dish. We'll come back to that.

We initially set up an AVCOM 2A receiver on the Hero and an identical AVCOM 2A on the neighboring Paraclypse. Then we went through the following procedure to verify that we were checking apples and apples:

- 1) We swapped the 85 degree Dexcel LNA on the Paraclypse for the 75 degree California Amplifier LNA on the Hero.
- 2) We took off both LNAs and put on a pair of Drake 85 degree



LNAs.

- 3) Then we swapped those LNAs back and forth, and then finally swapped the two AVCOM receivers so we had everything cross checked.
- 4) Finally we returned to the original LNA configuration, and cross checked AVCOM receivers one more time.

The bottom line.

The Hero 13 foot antenna was averaging **0.75 dB more gain** than the Paraclypse 12 footer. That put the Hero in the same class (to a tenth of a dB which is beyond careful measurement accuracy) as the USS 12.5 foot fiberglass antenna.

If we made the assumption that both the Hero's multi-multi strut/rib approach and the Paraclypse circular support ring approach results in about the same degree of 'surface accuracy' at 4 GHz, we would then **expect to see** between 0.5 and 1.0 dB more gain from a 13 footer than a 12 footer. In other words, both antennas would appear to be 'best of



MOTOR DRIVE uses chain drive system and is controlled by indoor east/west controller. The ability to scan the full sky, from Russia to F1R, is not to be underrated.

class' although there is an important 1 foot difference in size so they are not really in the same class when you get down to measuring gain.

Cranking the antenna around to the east, we found high quality service from Venezuela, Brazil and Russia's Ghorizont bird after we completed the final tracking adjustments on the eastern quadrant. We did not experiment with a 'circular polarizing slab' which might have picked up another 1.5 to 2.0 dB (best case) had we elected to modify the feed for the right hand circular feed employed by the eastern birds.

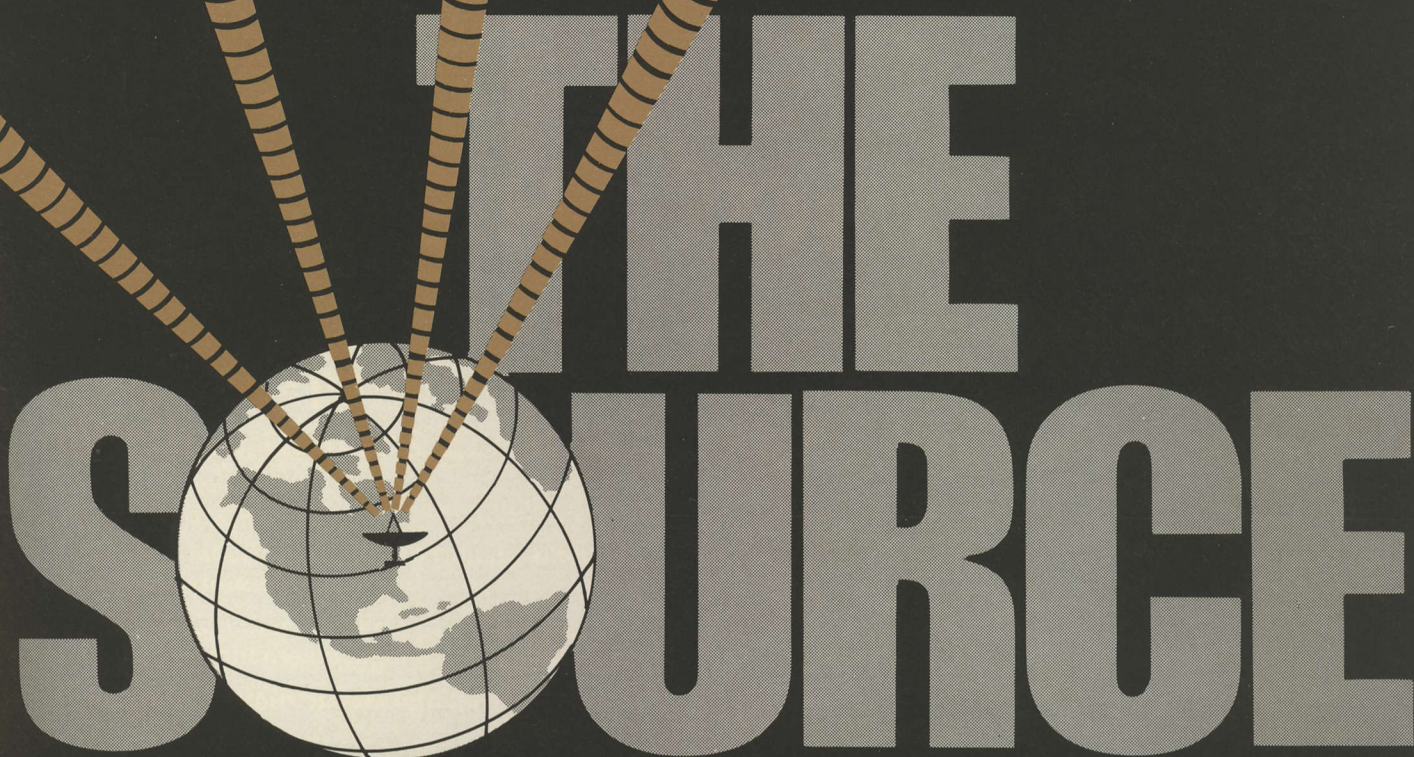
Sometimes, having a good working antenna which is properly dealer-priced is no guarantee that you will capture a share of the market. Hero's approach to pricing is to make the 13 footer, with motor drive, and all of the installation parts cited here, **come in lower** than say the Paraclypse 12 footer. If price were the only consideration, after performance, that ought to guarantee them a share of market.

Dealers, however, are concerned about at least three other factors:

- 1) **Installation time**, and ease of assembly. Time is still money, and there has to be a trade off between the time an installation requires and the amount of money that can be charged for the installation.
- 2) **The general appearance of the antenna**, in an urban environment. To be successful today, an antenna must have a 'finished' look, preferably as unobtrusive as possible, attracting no special interest as it rests in a yard. Zoning problems are still with us, and after the first few days of 'joy' the typical consumer wants to forget he has a dish stuck just outside the bedroom



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window.

- 3) **The lifetime of the product should be good.** Forever would be nice, five years seems like a reasonable compromise.

The HERO 13 footer is up scale from most of the competition in the time-of-assembly department. We tried to figure out how they could shorten that time, other than lots of practice. When you have that many struts/ribs to put into place, and a relatively small area to work in, there is only so much you can do in this department.

The appearance of the antenna, in an urban environment, is 'stark.' It is a big structure, and being aluminum in color does not hide its presence. Perhaps in a rural setting, the typical farmer would not find it objectionable. Perhaps in an urban environment buyers will not react as we fear; but placed next to a brown-toned Paracclipse, for example, it stands out dramatically.

(NOTE: Reacting to our concern, HERO subsequently has decided to finish the 10/13' antennas in a selection of colors; not bare aluminum.)

(The ten foot version, which CSD has not tested, but which should function every bit as well, allowing for the reduction in surface area, may well not have that 'overpowering' profile. Dealers who find ten foot antennas adequate for their service areas should overlook our comments on the appearance of the 13 foot if they are not likely to need an antenna this large.)

Most of the parts on the antenna (since it is virtually all aluminum) should last five years and then some. Those parts that are steel,

however, will require periodic maintenance just as any outdoor installed steel parts require maintenance.

Hero approaches the domestic market with some trepidation; not quite certain what to expect after concentrating on off-shore packaged systems for the last several years. The Hero marketplace is largely monied, people of influence, wealth and power, living in an 'overseas' location. Elaborate multi-dish terminals in Saudi Arabia costing as much as the typical dealer grosses all year long sweating out dozens and dozens of small ten or 12 foot dishes have been the 'norm' for Hero in recent years. They have pioneered large (very large) mesh dishes, large horizon to horizon tracking systems, and more recently reasonably-priced single channel per carrier FM receivers (see CSD/2 for March). In doing this, the Hero staff has become a closely knit family of engineers and technicians who usually speak several languages, fluently, and who are as comfortable in The Philippines installing a system as you are 30 miles from home.

The transition to the domestic market will not be easy. Hero's Behar insists that they have the production capabilities and the right products to make a dent in the domestic marketplace. What remains is for the dealers of the industry to carefully study the Hero small-dish line-up (10 and 13 foot dishes) and make the final marketplace determination. Selling a \$300,000 system to a king is one thing; selling a 13 foot antenna package to a dealer in Ottumwa, Iowa may prove infinitely more complex.

THE ROOTS OF TVRO (Part 13)

(This series originally appeared in Coop's CATJ Magazine in 1975, playing a key role in obtaining deregulation for small cable TV systems. Tracing the history of terrestrial TV in the USA helps you better understand the present interest in satellite TV.)

As the FCC tried hard to look busy, it began to grind out more flags for raising. One of the popular creations in the early summer of 1955 was a plan which the FCC conceived to *make the transmitter and receiver manufacturers responsible* for the ills of UHF. The FCC toured the country talking it up, and these remarks by Commissioner George C. McConnaughey were typical:

"The Commission feels strongly about the advent of super power for UHF telecasters. We have instructed the FCC staff to initiate rule-making proceedings designed to step up

the maximum legal power for UHF stations to 5,000,000 watts. We are also looking into how UHF receivers can be made more sensitive. We want to equalize the comparative coverage of VHF and UHF stations."

Somehow that all seems *pretty dumb* twenty years later; sure UHF stations suffered coverage problems, and sure UHF receivers were pretty bad, when compared to VHF receivers. But the *biggest* problem facing UHF broadcasters was not their coverage; it was the fact that *they couldn't obtain network affiliations* or programs which people wanted to watch. All of the coverage in the world wouldn't attract viewers, as the New England station found out when it offered \$1,000 to *ANYONE* who would call the station; all evening long, *and nobody called*.

The Senate Interstate and Foreign Commerce Committee hearings were scheduled to start anew in the fall of 1955 but were put off until after the first of 1956. Senator Magnuson said:

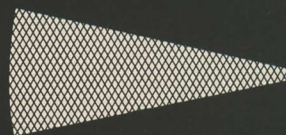
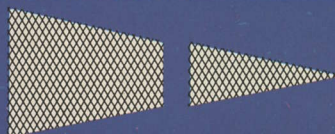
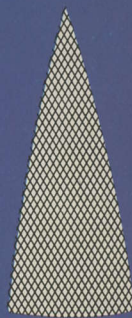
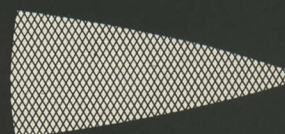
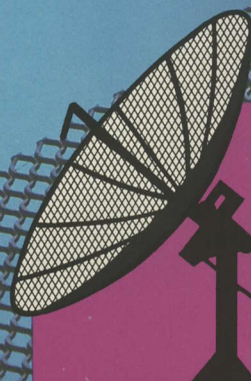
"I just cannot round up enough members of the committee to sit as a hearing this fall. I am also afraid that the FCC's tabling of their program to investigate and start selective



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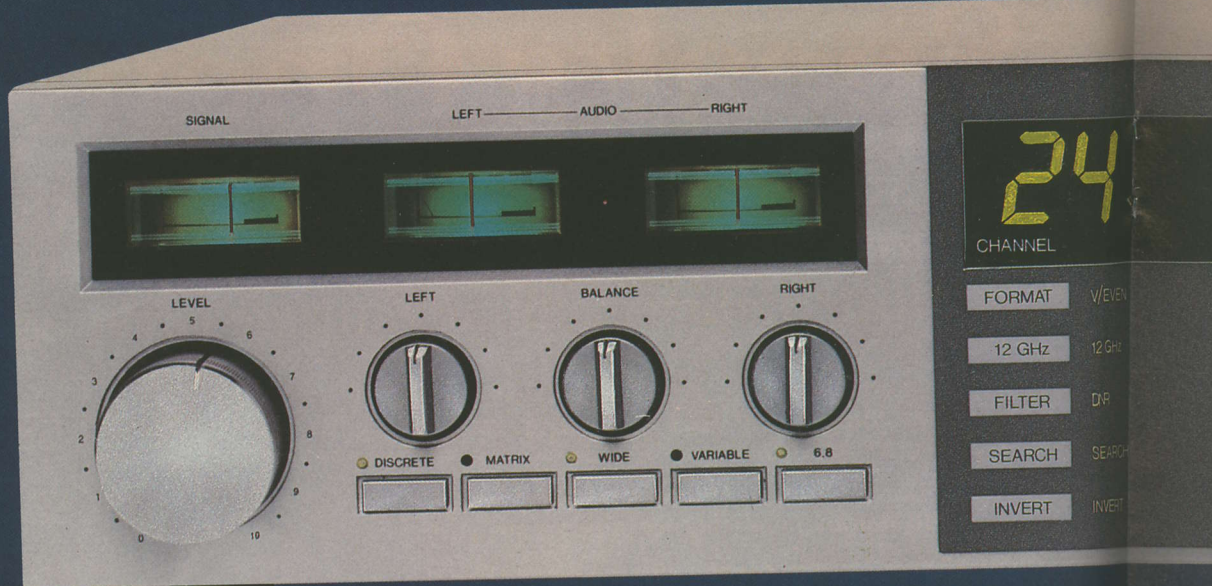
*Convenience and style
combined with the latest in
TVRO technology makes the
Boman Model SR2500 the receiver
to which others will be compared.*

Audio Group



Separate meters showing Signal Strength and Left - Right audio levels are provided with soft green illumination. Left-Right audio channel tuning is adjusted by separate controls. A balance control is provided for attaining that perfect stereo effect.

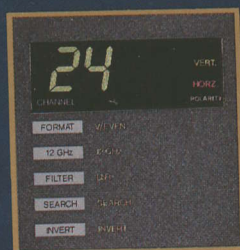
The pushbutton group consists of the "Discrete" and "Matrix" stereo buttons. Bandwidth is expanded by use of the "Wide" button. These three controls enhance the reception of all available audio transmissions.



The audio pushbuttons offer a choice of preset 6.8 tuning frequency for most video channels and variable audio for stereo or sub-carrier reception.

The Detent Volume control adjusts the volume and adds to the attractive design of the stereo section.

Function Group



The attractive display panel shows channel number and polarity position in a soft green color.

The Format button transposes the polarity mode when receiving signals from the few satellites with reversed polarity signals.

The 12 GHz button changes the operation of the SR-2500 from

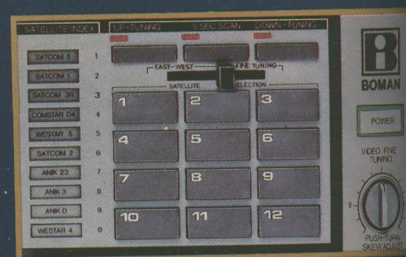
4 to 12 GHz when used with appropriate 12 GHz hardware.

DNR function provides a filtering of background noise from the audio thus providing very high quality audio performance especially on weaker signals.

A Search button gives a fast scan of all channels and is of assistance during the initial alignment and orientation of the programmable moving control.

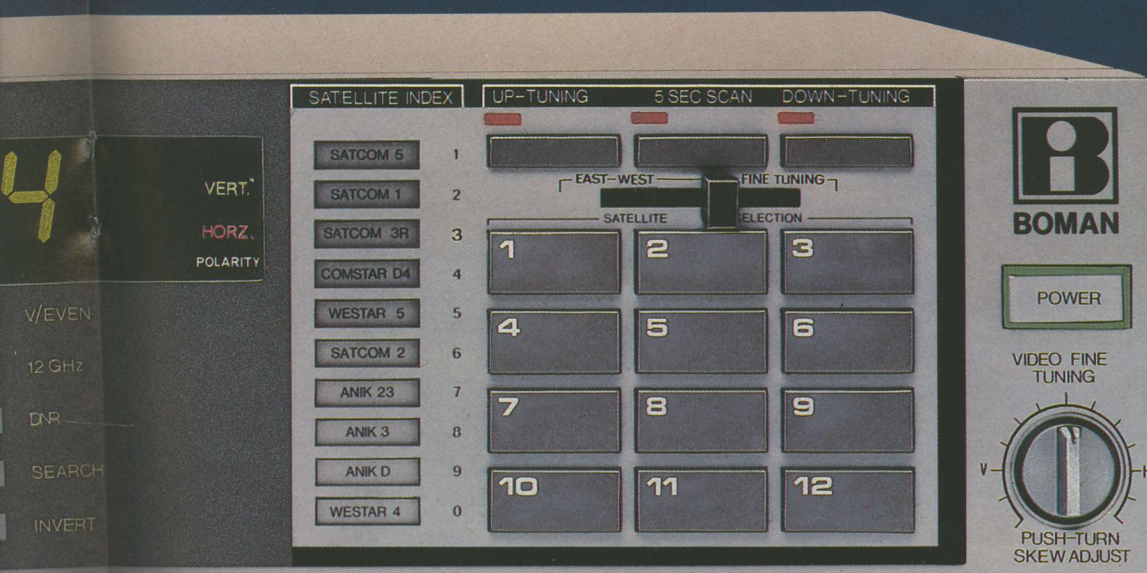
The Invert button is provided for reception of inverted video signals.

Satellite Selection Group



Satellite selection is accomplished with the 12 pushbutton pad.

All In One.



MODEL SR-2500

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value... ALL IN ONE product.

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The interfaced control then automatically moves the antenna to the pre-programmed position.

A removable Satellite Index is provided which indicates the selected satellite. Up to 12 different choices of satellites may be illuminated individually. Additional satellite decals are furnished to provide a maximum of 24 satellite variations.

The East/West fine tuning control is used for that extra special antenna peaking which is sometimes required.

The "UP" and "DOWN" tuning buttons provide manual selection or scan of channels in 1 step or 2 step and continuous operation. The 5 second Scan button allows the user to view each channel for 5 seconds during the 24 channel scan.

Video Fine Tuning and Skew adjustment is made quick and easy using the dual function fine tuning control.

Other features found either inside or on the rear panel of the SR-2500 are:

- Automatic Polarity Switching.
- Command Tone Response:
A "Beep" audio tone is heard when any of the Feather-Touch push-buttons is used.
- LNA/Down Converter power remains on when the unit power is switched off: *No more LNA/DC warm-up drift.*
- Integrated Channel 3 - 4 Modulator.
- 1 -2 Step Channel Advance Switch.
- Separate Sub-carrier Outlet.
- IF Gain Control.
- Cable Length Compensation Control.
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ROOTS/ continued from page 50

de-intermixture of VHF and UHF operations has soured some members of this Committee who want to see how that goes before we reconvene these hearings."

With the hearings canceled, there was also another failure. Sidney Davis, the counsellor for the group, resigned shortly after he announced that the Committee should immediately begin hearings into network practices (see special report in April CATJ). He resigned for reasons of "ill health," but many were *certain* he resigned because ranking Republican members of the Committee *did not want him looking into* hush-hush network operations.

Without any hearings going on and the FCC "chilling new VHF" and "tabling de-intermixture," *the radical plans came back.*

Commissioner Robert E. Lee wanted all of the UHF channels scrapped and the VHF channels expanded above channel 13 (like the original allocation table that had channels 1-19 before World War II).

Commissioner Doerfer wanted *all* television operation in Los Angeles, New York, and Chicago placed on UHF.

A Washington consultant liked another plan. He said that at least 200 more low-power channel 2-13 stations could be "dropped in" those 100 communities where VHF already had a good foothold, "through a liberalization of mileage separation standards now practiced."

Nobody took him seriously enough at the time to even point out to him that 200 low-power VHF stations *would have the same commercial problems* as 200 high-power UHF stations;

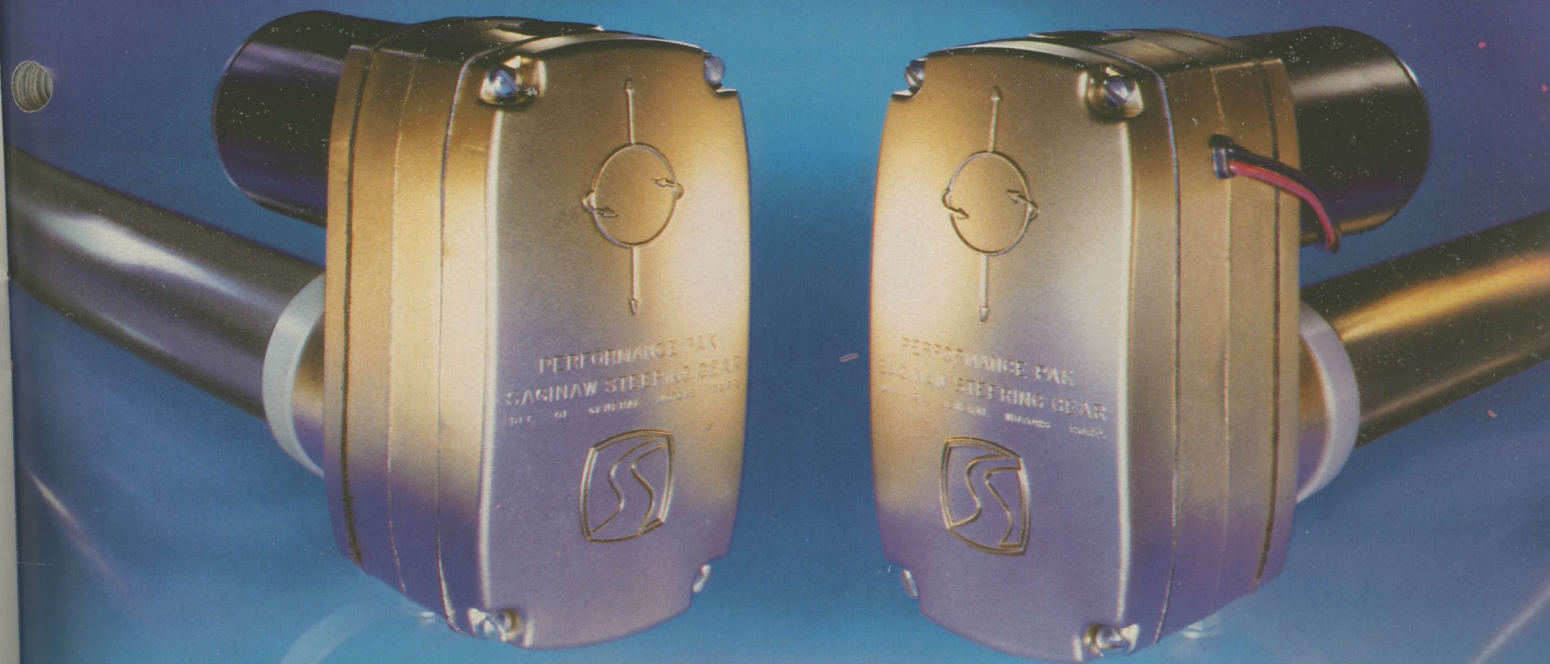
if they could *not* compete for area coverage with the established V's in the area, they would *not* get network affiliation and would fold up and go off the air also.

Commissioner Robert E. Lee didn't give up so easily however. He came back the next month with a plan to scrap UHF (*"It isn't going anywhere anyhow,"* he would say) and expand the VHF range from 174-216 MHz (channels 7-13) to 174-342 MHz (adding 21 new VHF channels). Lee suggested that the Commission "simply move all of the existing users of that frequency range (made up of the military, thousands of two-way radio users, and virtually all of the important air navigation frequencies for commercial use) to the UHF TV band." The plan never flew, although Lee kept the flag flying for a couple of years.

In the meantime many additional UHF stations left the air, among them: WQXI-TV, channel 36, Atlanta, Ga.; WNEX-TV, channel 47, Macon, Ga.; WEEU-TV, channel 33, Reading, Pa.; WNET-TV, channel 16, Providence, R.I. The number of UHF stations then on the air, in this period, was actually going down month by month as more stations left the air then came on new to replace them.

Just to muddy the water, CBS, which was rapidly becoming known in official Washington circles as *"the spoiler,"* hired a "consultant" who delivered his own glad tidings of the *future* of television. He said:

"The forecast that within five years of the TV freeze lift at least 2,000 television stations would be operating in the United States was wrong. There is a ceiling of 600 stations, give or take 50, for this country. These 600 stations will take care of the television viewing needs of 95-97% of the families throughout the country, without broadcasting satellites. With the use of station-operated satel-



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The Ball Screw positioner comes with the well known gold colored thrust tubes. The Acme Screw twin comes with silver colored tubes.

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lite stations, this number can be pushed to 100% of the families in the nation. I expect that two-thirds of the 1,800 channels set aside by the Commission in 1952 will go unused, or they will be used only for short periods of time by stations which will face bleak futures.

The maximum number of 600 (commercial, not ETV) stations was arrived at by estimating the coverage of VHF stations (he completely ignored UHF as a failure) at 50-75 miles. Larger radii of coverage (i.e. larger than 50-75 miles) would lead to fewer economically supportable stations to cover a given area, while shorter radii reduce the number of market centers which can support a station. That is, many market centers which can support a station with a 50-mile radius of service can no longer support a station when the radius is drawn in to 25 miles."

It made the best sense in the world, and had the Commission bought this thesis *even as late as* 1956, or even understood it, at that time the nation's TV coverage problems could have been vastly eased with a slightly revamped VHF-only allocations program. But alas, the Commission was still counting forests, and the trees were just not that interesting. However, today, twenty years hence, with a *virtually saturated TV station* situation nationwide, there are just 700 commercial VHF and UHF outlets in the country, some of which *are* satellites. Allowing for the national growth in the interim twenty years, the CBS consultant was not very far off!

Under heavy attack, the Commission sent out a "Gee, Look What a Good Job We Have Done" announcement. It reported that "many of the objectives of the 1952 allocations order have been met; over 90% of the population can now receive a degree of service from at least one television station, and approximately 75% can re-

ceive some service from two or more stations. At least 275 communities have one station operating, and 112 of these have two or more stations operating."

When the delayed Senate hearings began once again after the first of the year in 1956, Senator Pastore laid down the law for the Commissioners present:

"We have got to act fast and get the allocation situation really straightened out."

To which the Commissioners reported on their plans for de-intermixture, and they talked of a *new* plan. This one was called "translators," which the Commission explained would operate unattended to extend the coverage areas of television stations by rebroadcasting the direct received signal into a community or valley on a UHF channel (70-83). "*Such stations would not locally originate any programming; they would merely serve as relays for the parent station,*" it was reported.

Some of the Senate Committee members were not very impressed, and they announced that the FCC needed some help from an outside group. Accordingly, an ad-hoc committee of 12 was formed to look into a "competitive-to-the-FCC allocations plan." Among those serving on the ad-hoc group would be William S. Duttera, Chief of Staff Allocations at NBC; Dr. Allen B. DuMont of DuMont; Frank Marx, Vice President of Engineering for ABC; Curtis B. Plummer, Chief of the FCC Broadcast Bureau; Ralph Harmon, Westinghouse Engineering Vice President; T.A.M. Craven, Washington consultant, former FCC Chief Engineer and former FCC Commissioner; and CBS Vice

President William S. Lodge.

Strangely how, twenty years hence, the cards look stacked against the viewer and the UHF operator!

RCA announced an interesting self-help proposition in the spring of 1956. They said:

"If the Congress will exempt all-channel (i.e. channels 2-83) color sets from the excise tax, we will take appropriate steps to provide for the production of only all-channel color receivers as soon as practicable."

By early summer of 1956 *even the Commission* was looking at some far-out, radical plans. It was announced (here comes the flag) that they were considering moving *all* stations to UHF from a line drawn between Chicago and New Orleans-east. In effect, the east would be all UHF, and the west

Later, in 1955 television station KFSA (channel 22) in Fort Smith, Arkansas, appearing before the Commission for permission to install *its own* microwave relay link, would testify:

"The closest coaxial cable with network programs is 150 miles away; the use of the interconnection facility would cost \$5,200 per month for microwave service from the telephone company. If we could operate our own microwave system, it would cost us \$2,000 monthly."

At that time, FCC rules only allowed microwave hookups for *temporary* events, such as covering live events remote from the studio. The Commission would *eventually* change that rule, but *not before* many UHF stations had folded; *many of whom* would cite the *high* cost of physical interconnection to the networks as *part* of their reason for failure.

would be primarily all VHF.

The flag stayed up until early fall, when it came down never to be heard from again.

When *the all-UHF east* didn't fly, the FCC decided *once and for all* to blame the mess on the receiver and transmitter manufacturers. It came out and asked the industry to "expedite" its research-and-development plans to implement more-sensitive receivers and more-powerful transmitters.

And one month after the FCC abandoned *the all-UHF-east* program, the Senate Commerce Committee showed that *it was up to date* when it *approved* of the FCC's (earlier) plan to shift all TV to UHF, or a substantial part of television to UHF, *as the Commission saw fit*.

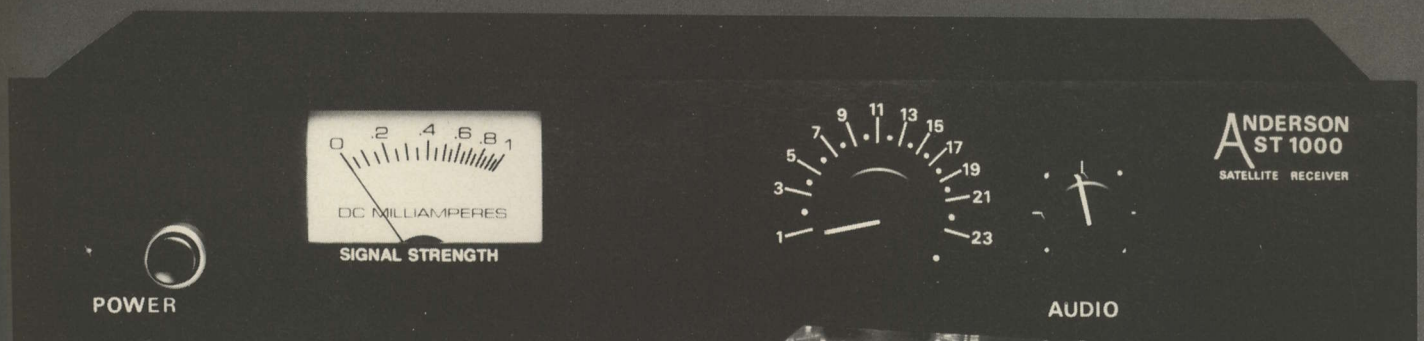
And so the cycle had gone the almost full circle. The Senate was *through*; Interstate and Foreign Commerce had appointed a 12-man committee to *look* into the problem, and Commerce had given the FCC the green light to shift everyone or most everyone to UHF.

The Commission *itself had decided* to put the blame on industry receiver and transmitter manufacturers. FCC Chairman George C. McConaughy told a broadcaster group:

"The present plan and goal offers the best hope on the horizon for facilitating the expression of this nation's TV service. As a citizen of a country which can send aircraft hurtling through the air at speeds approaching 2,000 miles per hour, how can I doubt the capability of the engineers of this industry to surmount the obstacles which until now have impeded progress in the utilization of the UHF portion of the spectrum for effective TV broadcasting?"

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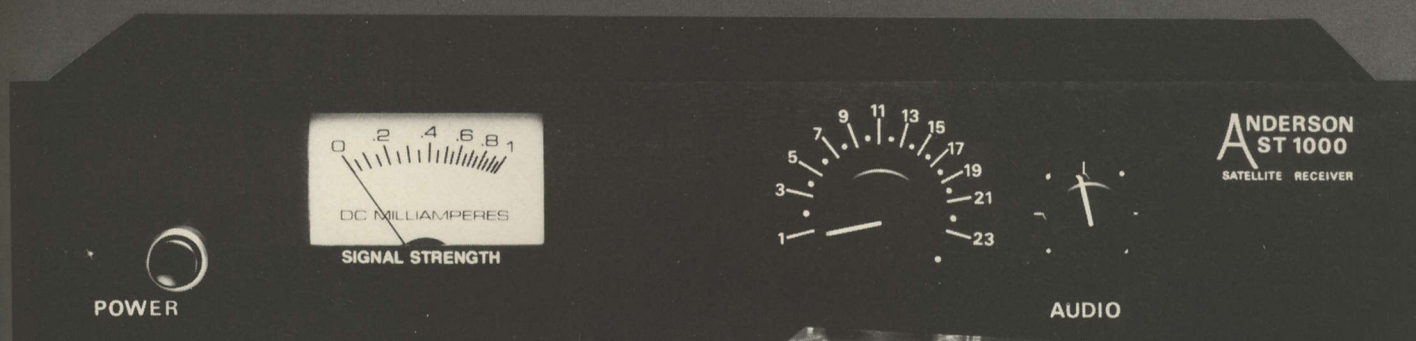
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started people thinking about the network influence on the eventual success of the TV allocations program died, although it went *out* with something of a bang.

INDUSTRY AT LARGE

CORRESPONDENCE, NOTES, REBUTTALS AND CHARGES . . .

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TUNNEL Vision

Abraham Lincoln's sage advice to the union, 'A House divided against itself cannot stand,' should be heeded by those involved in the joint trade shows in Las Vegas in March. The TVRO industry cheered the announcement by SPACE and STTI that negotiations at Orlando had brought forth an agreement to jointly produce the March show. We greet with dismay the news that this agreement has been nullified. Changing courses in mid-stream generally leads to a capsized boat.

Politically, 1984 will influence the growth, and indeed the entire profile of our industry. Legislation and pending court cases will set precedents that will affect us dramatically. It is vital that we make our voices heard by those in office. We recognize SPACE's special expertise in this area and feel that their efforts in Orlando should be commended. In turn, STTI has areas in which it excels. The combination of their talents in Las Vegas promised to provide a show that would bring us together and shore up our foundations as we faced the challenges of the political world, daily technological advances, and unparalleled business growth.

Today we are at a loss. We question the priorities that led to the breaking of the agreement. We suggest that the principals involved re-examine their decisions and take a long range look at where their tunnel vision may lead.

Dan Berge
President
Continental Satellite Systems
11485 S.E. Highway 212
Clackamas, Or. 97015

GOOD BUSINESS/Bad Ethics

After receiving a large envelope filled with contracts, letters and documents concerning a proposed joint venture between STTI and SPACE, I feel compelled to express my views and concerns over what is happening in our industry between these two organizations.

SPACE, in my eyes, is a very necessary and vital part of our industry. This organization has done some tremendous things in the past. We must not lose sight of the fact that it has been funded by individuals and companies concerned about the strength of the satellite industry, and now with the friction between these two organizations we all stand to lose.

I found out the first show Mr. Schneringer was involved in was in Omaha in the summer of 1981. SPACE arrived in Omaha in the summer of 1982. Because of this, STTI dropped Omaha from its list of show locations. Then SPACE attempts to hold a show in Las Vegas at approximately the same time as STTI; which leads us to where we are now.

"The FCC must be authorized to regulate the networks, because the two major networks exercise a stranglehold over the entire industry. This is a yoke of economic dominance which must be broken..."

In reviewing the letter sent to SPACE by Mr. Schneringer (which I do not think he intended should be made public), and after reading the proposed contract, I fail to see where STTI has very much to gain by going with SPACE. They do, however, have a great deal to lose.

I operate a small business. Should my competition move in right next door to me and try to solicit my clientele, only because they see that I have a good thing going, I will fight them with everything that I have, to keep what I have worked so hard for. I believe Mr. Schneringer is in this very position; SPACE has moved in on top of him and they are trying to solicit his clients.

In closing, I'm sure SPACE was created to keep our industry going against political and legal foes. And thus far it has done an excellent job. However, the issue now seems to be money and power. This promotes bad ethics, as we have seen. Let us return to our original goal with SPACE, and leave shows to those who operate them for a business.

Mark P. Splawn
Central Satellite Promotions
P.O. Box 3908
Edmond, Oklahoma 73083

Coop comments on business ethics, money and power on page 4 of this issue.

SHOW Stopper

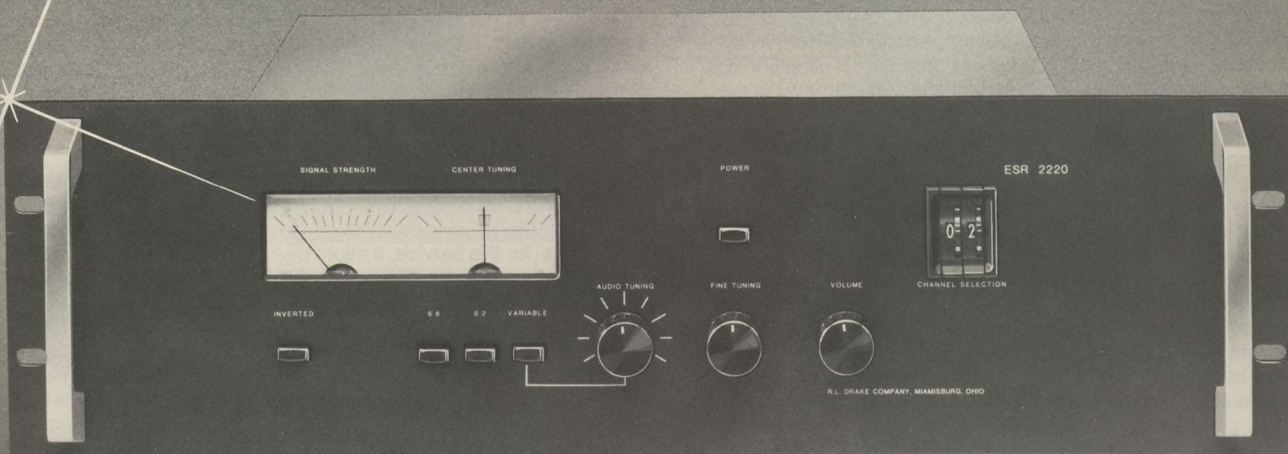
Security at STTI trade shows always leaves something to be desired, but we have been fortunate until the Nashville show. Some 'low life form' stole our most valuable item; the business card box! Needless to say we were very upset when this happened. We exhibit at shows for the specific purpose of talking with dealers, and by getting their business cards, we add them to our mailing list. So some thief incurred zero-show-cost, and reaped the full benefit of the show by walking off with our business card collection box.

I have a suggestion which I would like to see implemented at all trade shows. Each show registration form would have three boxes or lines. They would be as follows:

- ___ Consumer
- ___ Dealer
- ___ Notify exhibitors I want to be added to mailing lists

Now we have full flexibility. If a dealer wants all information mailed to him, he can so indicate on the form. If he desires information from just a few, he can use the business card-box method. This will also solve the problem of dealers running out of cards. I would very much appreciate it if Rick Schneringer would compile and distribute such a list. I would gladly pay to have such a list, after each show.

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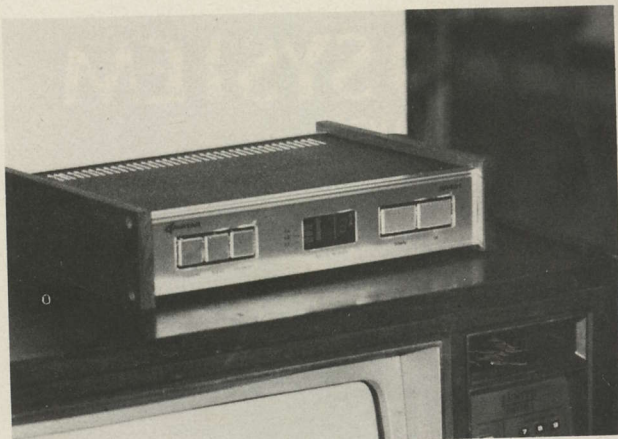
Stephen Kaloroplos
President
Satellite Television Systems
P.O. Box 668
Sandy Springs, SC 29677

Business card boxes are certainly vulnerable in a show atmosphere. Our feeling, however, is that many of the dealers and buyers on hand would possibly be reluctant to have their mail boxes stuffed with literature from 200+ exhibitors. Many would continue to favor the card box method. Some of the more professional shows create a plastic credit-card for each show registrant. Each booth then has a credit card 'machine' and when a guy wants on your list, he whips out his card and you run it through the machine, building your list as you go. The really top flight shows 'code' the cards so that the booth operator can see from the coding whether the guy is a consumer, a first time show goer, a rep from a major store line, and so on. This gives you selective qualification of each guy on your list. To make this work, and it can work very well, the registration form needs to be more detailed; showing to STTI or SPACE the various categories the fellow falls into. If those who take booths at shows want a better deal, they should form an 'exhibitor committee' and meet during each show to share their complaints and problems. After they do this, they should then 'elect' a few representatives to go to the show sponsor and present a list of requests. As long as exhibitors fight these battles all by themselves, you can't expect many changes. When you unify into a group, and you work out what you need and take those requests to show management, you will usually get far better results, more quickly. Anyone for starting an 'Exhibitors Trade Association'?

UNKNOWN Receiver

I wanted to drop you a line to let you know how much I have enjoyed CSD over the past two years. Also, I have come across a new product which I think CSD should take a look at, since it is usually in on the 'newest' and 'best' this industry has to offer. The product is the AVATAR SR 401 receiver. It is the best new receiver I have seen. They have no literature, yet, so people who are interested will have to write and hope for the best in the way of data. They are located at 416 S. Fifth St., Pocatello, Idaho 83201 and the unit has spectacular performance! In particular, the auto-fine-tune really sucks in the signal and keeps it locked up. There is no provision for fine tuning, and you absolutely don't need to fine tune anything. The picture absolutely will not edge-tear and when you manage to get sparklies on an exceptionally weak transponder, they have somehow managed to make them very small rather than big and streaking. The 30 hertz flicker is totally absent (one of my pet peeves with many otherwise fine receivers). I have been a user and fan of AVCOM receivers for years, so I do appreciate quality. This one is better (sorry Andy!). I hope they do well with it.

Glenn Grubb
123 Noah
Chubbucks, Idaho 83202



The AVATAR SR 401 is a new one to us. Glenn provides the set top photo of the unit seen here. Making sparklies 'smaller' on the screen is a noble goal, eliminating edge tear on black to white transitions is pleasing to the eye. If the people behind this get into production, perhaps we'll have the opportunity to test one here on Providenciales where we really separate the men from the boys!

AAAH-So

Please tell if I can provide oriental language programs, domestic or otherwise, to customers in the Anchorage, Alaska area. Second question; is there anyone selling a 16 foot dish tough enough to take our heavy winters but priced low enough for residential use? Finally, in the 'Coop Basic Manual' from STTI, on page 26 it mentions that the ICM 4200 receiver had the best weak signal performance of any receiver ever tested. Has there been a better weak signal receiver, in the intervening years?

Ron Smith
Construction Electronics
P.O. Box 883
Kenai, Alaska 99611

Oriental language programming is scarce; some appears on SPN, TR3, on F4. We are not aware of any other that is on a scheduled basis, on US DOMSAT birds. And anticipating your possible next question, the Japanese BS2a bird with its 12 GHz downlink is a very unlikely candidate from Anchorage (although you are better off than someone in Miami!). A tough 16 foot dish? We doubt ANY of the screen mesh antennas would stand up to your ice storms and wind, so that eliminates them. A very high grade 16 foot in the solid configuration is available from United Satellite Systems (USS) and it would take an Alaskan winter without grunting or groaning; or, coming apart. Price wise, it is very similar at the dealer level to the Paracclipse 16 foot (mesh) antenna; in fact, it is less money. Shipping is the only hang-up since it is a three piece fiberglass dish. 4200? We still love and carefully dust off our vintage 4200 every week. And we still use it. For its time, it had the best threshold performance of any.

BUILD Your Own Weather Satellite System?

I have received CSD for several year now and find it very helpful in my TVRO installations. I enjoyed the Weather Satellite article. (CSD, September 1983) and wonder if there are plans available to build your own terminal for this service. It might be hard to justify the cost of the commercial grade equipment shown in the report, but out of spare parts that have accumulated here, I think I could put one together. Is there a source of plans? I would also like to know more about the vertical blanking interval system. I am very interested in getting a diagram of a VBI decoding circuit and any information would be a help. I own a Radio Shack computer and if it were possible to interface the computer to the VBI decoder, it would make a very neat package.

Ralph Evans
RT. 1, Box 142
Harrisburg, Mo. 65256

'The Weather Satellite Handbook' from 73 Magazine, Elm Street, Peterborough, N.H. 03458 lists several complete do-it-yourself projects in the weather satellite field. Recommended. VBI? After a couple of years of messing around in this area, we think we finally have a knowledgeable person in this field willing to share his information. Watch for it here in CSD.

IT Worked

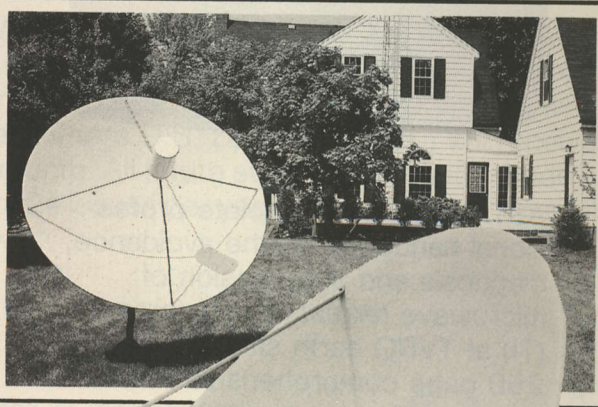
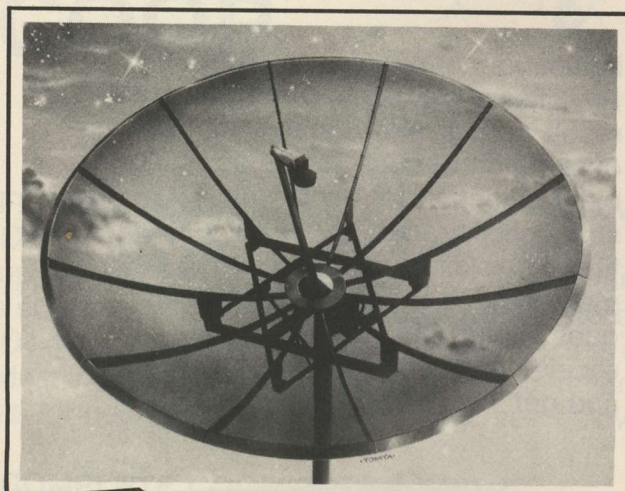
Many thanks for your answer to my antenna problem, in the September issue of CSD. I had written to report that with a 16 foot dish I was getting best pictures when the dish was off the satellite slightly. As you suggested, I did 'string' the dish using four strings, and sure enough, they crossed at the center of the dish. This showed the dish was not warped. The crossing point gave me a good reference to reposition the feed to the exact center alignment. It so happened that the true center of the dish did not align with the center of the horn. I relocated 2 of the 3 support legs so that the center of the feed (throat) and the center of the dish were now in line.



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industry leaders such as California Amplifier and Scientific Atlanta. The result of their effort is an in-depth exploration of such topics as equipment selection for minimizing TI susceptibility, use of natural and artificial shielding, system filtering and many other cost effective techniques! Send this coupon now to receive our free brochure on ASTI, and get TI out of the picture!



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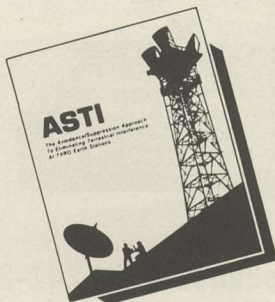


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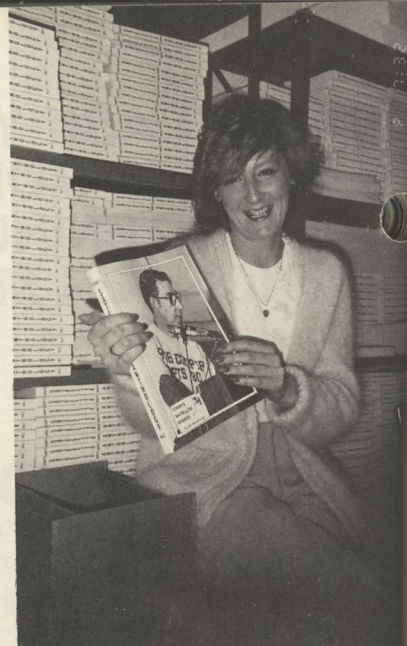
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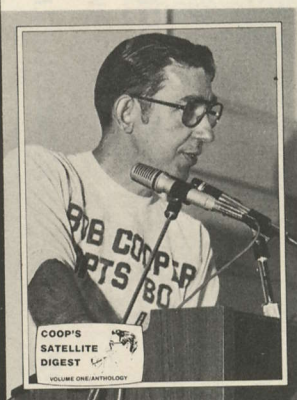
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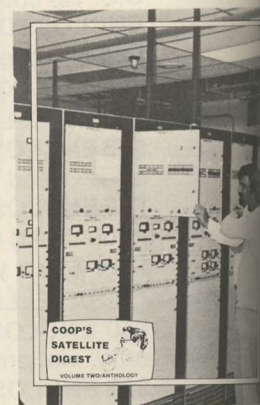


HERE IS my problem. Dashing through the office on the way to the Canadian Show in Vancouver, he asked me where I was going to ‘stick’ the new word processor and computer equipment. And then he ran to the airplane without waiting for me to think of an answer. I stewed about this for two days and realized **here** was my golden opportunity to get rid of those hundreds of **CSD ANTHOLOGIES** which have been getting in my way for nearly two years now. So quickly, before he knows what I have done, I want you to call me on the telephone (305/771-0505) and give me your VISA/Mastercard number. Then, **for a flat \$50**, I will send you via UPS \$100 worth of CSD ANTHOLOGIES. I believe you Americans call this a “**50%-Off Sale.**” I call it good riddance to two office walls crammed full of paper! Oh yes, just in case you don’t like calling, I can handle your order by mail as well, or at **EITHER** of the Las Vegas shows this month; in person (although I will still have to ship to you from our office via UPS). **Now**, if I could just figure out what we can do with a triple gross of ice cream cones, **I’d have this place ‘tidy’ in short order!**



VOLUME ONE/ The entire first year of our industry; from Volume 1, Number One in October of 1979 (Arthur C. Clarke appeared on the cover for the **first** time; inside, his famous 1945-penned ‘**Wireless World**’ article describing Geo-Stationary satellites) through 12 months of early growth. Did Taylor Howard **REALLY** design the first commercial TVRO receiver? Did Oliver Swan **REALLY** build satellite antennas out of chicken wire? Did Robert Coleman **REALLY** build working LNAs on his kitchen table, with no test equipment at all??? The first exciting year of the industry, our industry, is all here. Mint sets of **CSD** (the first 12 issues) are now selling in the industry for \$100 up. Heh-heh. Here is your chance to get all 12 in one tough cover for \$25. Shipping paid. **And I get a wall cleaned!**

VOLUME TWO/ The entire second year of our industry. Things are in high gear now. Sat-Tec **may ship** 150 receivers a month. LNA prices have tumbled; only \$795 for 120 degree units. Taylor Howard brings out the Chaparral “Super Feed” and a few talented people figure out how to tune in Russia direct. Coop moves to the Turks and Caicos and sets up a national television network. At the first Omaha show, antenna manufacturers go head to head to see which antenna has the most gain. Over half of those tested are not in business the next year. **SPACE** gets into high gear and big bucks, and the first import-TVRO hardware shows up from off-shore. Coupled with Volume I, **you have MORE** than 1,000 pages of exciting reading, including the best history of our industry ever created.



THIS HALF PRICE sale is for the month of March **only**. AND the \$50 price is only good for people who want their two volume set of CSD ANTHOLOGY shipped to a U.S. (zip code) address. Sorry; Canadian and other ‘foreign’ locations **still get a special March reduction** in price; but, not the \$50 rate. See **page 65** here (back one page) for all of the details. There is a convenient order form (**page 65**), or you can whip out your VISA/Master Charge Card and call me, **Carol Graba**, at CSD’s office here in Fort Lauderdale; telephone 305/771-0505 weekdays between 9 AM and 4 PM.

OR/

SEE ME in Las Vegas at the CSD/CSD-2 booths at either (or!) the **SPACE** Show March 18-20, the **STTI** Show March 20-22. I **cannot deliver** your ANTHOLOGY SET in Vegas, but I certainly can take your order in person and tell you about how much trouble I am going to be in if I don’t have that wall cleared out for our new word processing and computer equipment by April 1st! **P.S.** / All suggestions regarding disposing of two more walls filled with ice cream cones will be greatly appreciated!

CORRESPONDENCE/ continued from page 62

Then, per your suggestion, I lowered the angle of elevation on the dish. The north by south tracking did not require any further adjustment. To finish the job, I made allowance for the skew effect by rotating the orho mode coupler approximately 15 degrees because the even transponders on F3R were noisy and interfered with the odd transponders.

Voila! It worked very well and my problems are completely solved, to the point that transponders 6 and 22, which were quite poor, are now perfect. I have two receivers coupled to the LNAs, with splitters, DC blocks and a microwave switch.

Finally, there is this bit of coincidence. While I was in the United Kingdom whom should I run into but Bob Cooper! Thank you for providing such a systematic and clear answer to my request for help.

Werner Husemann
Monterrey, N.L. Mexico

Now we know who that man was who ran up to us in London, shook our hand and thanked us for helping him fix his antenna! As you disappeared back into the crowd we turned to a companion and remarked, "Either this is a very small world, or that chap has mistaken us for someone else." Delighted the list of probable causes given in CSD, in response to your letter, narrowed it down for you. Who says you can't fix a 16 foot dish by remote control!

CANADIANS Not Guilty

I am writing in regard to a remark made in the December issue of CSD where you stated "Many of the offshore buyers now purchase their goods in Canada where no export controls exist." I wish that were true!

I am presently wading through a one inch stack of Canadian Government export regulations and control lists to allow us to ship a recently completed 8.4 meter antenna system out of Canada. Not only must we comply with Canadian permit regulations, but the Canadian government also contacts the US government for clearance of any US products we may be shipping. As we represent Standard Communications and carry Blonder Tongue products for Canada, we have the pleasure of requesting clearance from both countries!

Any Canadians that are presently exporting TVRO equipment without first checking into the required permits are risking a lot of hassle. I would suggest that they, or anyone planning to export to any country other than the US, contact the Canadian Department of External Affairs, 10th Floor East, 235 Queen Street, Ottawa, Canada.

Cliff Paterson
Earth Stations Division
Teletronics Ltd.
#5-2215-27th Avenue N.E.
Calgary, Alberta
T2E 7M4 Canada

Anyone who doubts the ability of man to make a bureaucratic jungle out of virtually every form of human endeavor has to but study Cliff's street address. "#5-2215-27th Avenue N.E."? What-ever happened to 502 W. Main Street!

HBO Advertising A No-No

We recently received a letter from HBO/Home Box Office regarding our present newspaper advertising. Our advertising (sample enclosed) draws a direct comparison between owning your own TVRO system, and, subscribing to a local cable service. Apparently we have struck a 'raw nerve' in the process. The final paragraph of the 'form letter' states:

"... HBO and Cinemax requests that you inform both actual and potential purchasers of your earth stations that the unauthorized interception of the HBO and Cinemax services is illegal and violators are subject to civil and criminal sanctions...". Has this, really, been determined?

Ronald J. Meyer
President and General Manager
Sky Scanner Satellite Systems, Inc.
1100 First Street N.E.
Winter Haven, Fl. 33880

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Public display of unauthorized services, such as HBO and Cinemax (they are always unauthorized since neither grants authorization) is the precise bottom line of the present Wichita lawsuit (see CSD; January, Coop's Comments). Private display, within a home, is not presently being challenged in court and there have been no court cases in the past relating to this topic; in the United States. In Canada, there have been court cases which have found that quite the contrary is true; it is NOT illegal to do either of the above, under Canadian law. HBO must continue to write letters like this to protect whatever rights it may have, in the future. Protecting one's ownership rights in this grey area is much like Coca Cola or Xerox allowing people to print either name without an ® afterwards; or closer to home, Chaparral allowing people to print Polaroid without an ® or ® (see CSD for January, page 26). If you have rights, trademark or otherwise, and you do not bother to protect those rights, you lose them.

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P.O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505.

HUGHES is serious about plans to operate aggressive 12 GHz domestic bird system for US; would launch a pair of birds with EIRP in 48-54 dBw region from 101 west, totaling 32 channels of information. Application at FCC, where much controversy exists over Hughes activities.

RECENT round of applications for 12 GHz spots, including Hughes, will force FCC to make choices; there are 8 orbital spots available at each of 8 locations assigned by World Administrative Radio Conference. Applicants exceed 32 transponder capability at 3 of 8 locations. Most popular are 148, 119 and 101 west.

LATEST FCC study of satellite activity reflects more transponders available, fewer being used overall. FCC does regular monitoring of satellites from Maryland facility, counting transponders in use, and measures how each is used. Most recent count showed 312 total transponders, at 4 GHz, but 143 of these were not in use.

CHINESE launch of 4 GHz bird follows agreement signed with SPAR Aerospace (Canada) for \$16M (US) in 4 GHz terminals reportedly to be installed on offshore drilling rigs and in remote areas of China.

CBS, one of many planners of 12 GHz DBS, has signed an agreement with TRW for construction of 6 channel spacecraft. TRW has not been active as supplier of complete satellites since third generation of Intelsat birds in early 1970 period.

HUGHES has signed a contract with 12 GHz systems planner Advanced Business Communications, Inc.; amid reports that in return for order and 'credit line' Hughes will end up with 96% of ABCI. A pair of 50 watt birds is planned. Opponents are saying deal represents takeover of ABCI by Hughes and subsidiary Hughes firms.

JAPAN's BS 2A bird launched successfully scheduled for start-up of 12 GHz two channel television service to main and outlying islands May 1. Matsushita and Toshiba have both announced terminal; prices range from \$450 (US) for 2 foot dish system to \$555 (US) for 3 foot dish system.

USCI, much written about early bird user of 12 GHz DBS through Canadian ANIK bird, has opened up Washington (DC) area for marketing, following up Indiana and Illinois markets. Meanwhile, two co-founders of USCI, Richard Blume and Cliff Friedland, have left active participation in firm to 'explore other opportunities.' The pair have combined ownership of slightly less than 10% of firm.

NASA will build a gigantic low orbit 'space station' with a target launch date in 1991/2 period. Station would have crew as large as 10, could cost as much as \$9B (US) according to present plans.

NEW JERSEY state Superior Court has ruled that if FCC will not allow cable TV to keep SMATV out of state private cable business, those developments opting for private cable must also allow CATV in the same area. Effect is to insure that where SMATV is built, cable TV will also have customer access, ending 'exclusive' nature of SMATV.

POLICY GROUPS in Washington have come out in the open favoring allowing applicants for private trans-Atlantic satellite service to own and operate satellites in competition to Intelsat. However, recommendation is that such systems be only available to those who will own their own transponders, thereby eliminating leased and rented use of transponders or space on transponders. No final decisions yet.

CARIBBEAN area now has informal ad-hoc group to represent its satellite communication needs. Caribbean Basin Telecommunications Consortium is privately funded and backed federation seeking to develop plans for either Caribbean satellite or leased use of transponders for program exchange within the Caribbean.

USSSI and Rainbow Satellite, two early winners of 12 GHz FCC permission, have both requested extension of time to provide 'proof' of their financial ability to order and launch their respective satellites. FCC grants had been conditioned upon strong showings of financial ability; so far not demonstrated.

INTELSAT V, F8, originally last-scheduled for launch February 8th has been re-scheduled for very end of February. Persistent problems with maritime communications system, aboard satellite, is reason.

COMSAT's STC direct broadcast service has reserved a pair of launch positions on Shuttle; May and August 1986. RCA is building the 'high power' six channel birds. STC will begin interim 'low power' DBS using SBS-IV this fall in northeast.

CANADIAN hearings on question of allowing US satellite premium/specialty services to operate in Canada revealed unusual plans of several services. DISNEY revealed it might 'abandon' W5 as early as this April/May, in favor of G1 and confirmed they will scramble feeds on G1 'eventually.' Nashville plans to go to G1, but also said it will never scramble. ESPN, also planning G1 feed, would not reveal scrambling plans.

CANADA's Premier Choix pay service has folded on 12 GHz. The stand alone service has been taken over by French language TVEC and TVEC will now be a national service with two C3 spot beams. TVEC has had some 'morals' problems airing what opponents call 'explicit films.'

SUPERCHANNEL, which markets in Alberta and Ontario on C3, has been given approval to market in all areas west of Quebec.

JAPANESE regional (Pacific area) 4 GHz satellite service, using satellites built in USA, is coming closer. Although Japanese possess technology to build own 4 GHz bird for this purpose, apparently they are under heavy pressures from Washington to use US birds.

MEXICO plans 65,000 TVRO systems for educational applications, and is trying to coordinate infra-structure within country to produce both antennas and electronics for the terminals.

ABC has exercised option to purchase a segment of ESPN while ESPN proper will probably be sold out from new Pennzoil controlled Getty Oil; present majority owner of ESPN. ABC may end up owning all of ESPN before it is all over.

BRITISH up in arms over Skychannel's heavy concentration of US television programs. Skychannel is Europe's first international English language (12 GHz delivered) cable service, operating five hours per day. Present British regulations limit 'foreign originated program content' to 14% of broadcast day. Skychannel has more than 50% coming from USA.

CBS has agreed to purchase nearly 200 4 GHz terminals from Scientific Atlanta to create national multi-channel network feed system. All affiliates will have twin dishes; 7.1 and 4.6 meters in size although control of dishes and transponders tuned-in will come from master switching center in New York City. First systems now going in,



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CBS is now feeding approximately ten minutes per day of television news material to a pair of Colombian television networks, via satellite.

M/A COM Linkabit has demonstrated VideoCipher II operation using **six foot dish**, at Texas Cable Television Association trade show in Texas; Galaxy 1. Most unusual part of demonstration? Six foot dish had 'offset feed' which with dish contouring is reported to improve system efficiency and reduce sidelobe performance in 2 degree spacing situation. Dish was experimental model.

FIRST UK use of Skychannel has begun; 10,000 Subscriber Swindon cable system started carrying service in mid-January.

CAMPUS NETWORK now feeding average of four hours weekly to colleges and universities. Westar 4 is used.

LUXOR, Swedish company producing television receivers worldwide and 4 GHz satellite receivers for North America, has merged with another Scandinavian firm; Finnish Nokia Group. Swedish government owns approximately 30% of Luxor.

JAPANESE government looking for someone to help them test direct 4 GHz transmissions from Japan's CSE-1 satellite to whole of Alaska. CSE-1 bird has 4 GHz capability, and is not presently in use. Permission to re-locate bird to 150 degrees east (from 135 east) has been obtained from international coordinators. Various US government agencies have not been willing to help with the tests; needed are transportable terminals capable of working down to 5 degree look angles.

ANOTHER customer for Telstar T1 bird; Meadowlands Communications will install uplinks in New Jersey, Chicago, LA, Dallas and Washington to send sporting events via satellite (T1) to broadcast and other users. Ambitious plan is to eventually install uplinks at each of the major league baseball parks nationwide.

SUPREME COURT decision to nullify lower court ruling that home videotaping may violate copyrights taken as victory by TVRO interests. Parallels between home videotaping, and, home satellite watching are many. Recitation of the court ruling will undoubtedly be found in numerous future industry courtroom and legislative battles.

COOP/ continued from page 5

the FCC on the New Jersey SMATV operator's case, the 'official SPACE' position was that the State of New Jersey should NOT be told that SMATV systems were protected by the FCC. Now, it turned out that the FCC decided **with** the SMATV operator, and it in turn told New Jersey to **not regulate** SMATV. During this period Brown was telling the New Jersey SMATV operator that he would be better off taking his case to court, going through the long and drawn out courtroom process, rather than trying to get the FCC involved.

Schneider has thoughts on this. So do many others.

'There are two possibilities here why Brown elected to take the position he did. If he was representing SPACE and Suburban Cablevision **at the same time**, and he took the Suburban position in the case, he would like to see Suburban win. If the FCC ruled that SMATV systems are exempt from state regulation, **Suburban loses**. The other possibility is that an attorney can make far more money by hauling a case like this into court than he can writing one filing for the FCC. A case like this, in court, could ultimately end up at the U.S. Supreme Court. And all along the way, the attorneys would rake in the bucks.'

We talked with Rick Brown about this matter. Here is his own-stated position.

'If the FCC pre-empted the state regulation of SMATV, that would make the SMATV systems vulnerable to federal rules and regulations. We cannot reasonably expect the FCC to pre-empt the states and then leave SMATV alone. A pre-emption is preliminary to a complex set of rules and regulations governing SMATV, at the federal level.'

What about the 'conflict' issue; co-representing SPACE, and Suburban?

"Brown and Finn no longer represent Suburban Cablevision; this case was an obvious conflict for us."

Sutro on the conflict. "I have trouble with both statements. I am

further troubled because as one of the SMATV operators on the Board, **I was not asked** for an opinion on how SPACE should file with the FCC on this matter. I am not sure why we have SMATV operators on the Board if they are not even consulted in an important matter such as this."

And some would view this whole scenario as more than a **'possible conflict of interest.'**

One could build a list of people who, if they were elected to the Board of Directors and if in the majority, would in short order eliminate **any** possible conflict of interest with Mr. Brown. Which is another way of saying that there is very strong division within the industry over Brown's activities as SPACE's head man. We'll return to how a major change in the Board of Directors might also result in a major change in SPACE.

If Brown's attempt in the summer of '82 to divide SPACE into four separate groups failed, he did not give up. **The Super Fund came up.**

Unable to create a 'super-board' that would sit over three lesser boards, Brown created the 'Super Fund' concept in the spring of 1983. SPACE had something called 'The Defense Fund.' This was started in 1982 as a way of collecting **larger sums of money** for legal purposes. The number one stated purpose was to create an **'Anti-Trust case against HBO (et al) to force the premium programmers to deal with individual, home, TVRO terminals.'** Brown had been persuasive on this issue; without our industry attacking their industry, in court, before Congress, even at the FCC, our industry would always be 'pirates' and sooner or later the industry would wither and die. The Defense Fund was supposed to change that. **An Anti-Trust suit was promised by Brown**, but he needed a considerable six-figure sum of money before such a suit could be started. Ten or so Pioneer member firms initially agreed to put in some sizeable amounts of money every month, **tagged for this purpose.** The Board of Directors would 'administer' the fund, approving the projects on which it was spent, if not the actual expenditures.

There was controversy over the Defense Fund. Not all of the Board favored litigation against HBO, and many Pioneers who were not members of the Board were also opposed. **David McClaskey** of Intersat on that subject.

'I never believed that we had to go to court to get HBO to deal with us. I always felt that when our industry reached enough homes, when we had a significant number of potential customers out there, HBO would work it out on their own. They would come to our industry with their own plan. I saw the problem as being timing, and, marketing. Not as legal.'

Schneider on the same subject.

'Brown has been on a gang plank on this one; every month the industry grew larger, we were getting closer and closer to critical mass. Sooner or later HBO **would deal** with home terminals. When that happened, much of the reason for Brown's big fees was over. He knew he had to get the money flowing soon or the industry was going to catch on to what was happening.'

Brown would disagree of course.

'HBO can't deal with us now (spring of 1984) because they do not have the movie rights for private, home terminals.' Implied here is that if HBO is **trying** to work it out and cannot, then SPACE would have to go after the movie companies directly. **Legally.**

HBO would disagree with Brown, insisting that it **was being worked out**, that it would work out. **This year.**

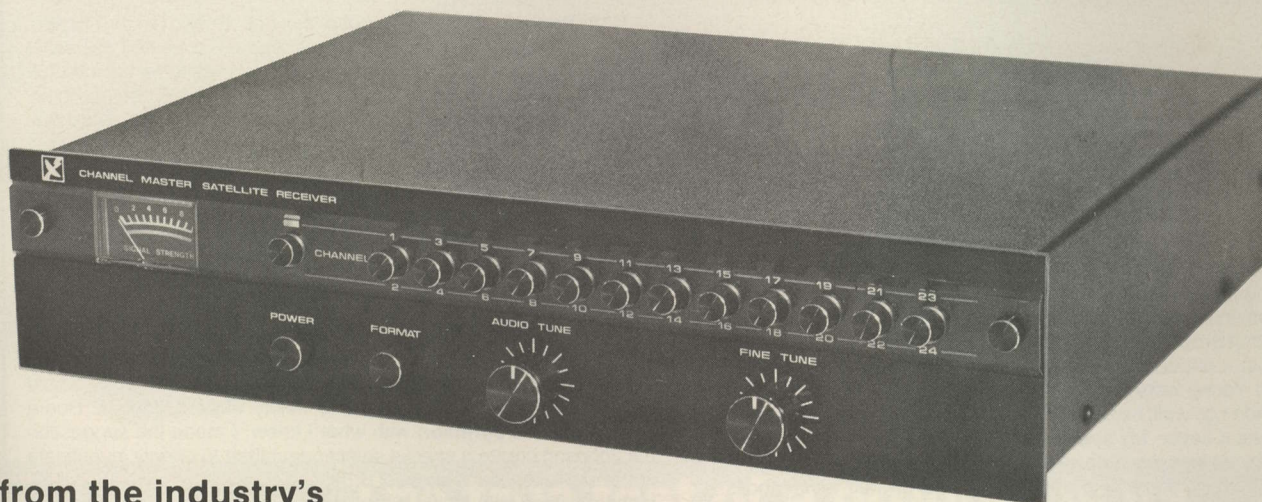
The Super Fund was more popular than the Defense Fund. More important than that, the Super Fund was a 'private club'; a legally created private club, outside of SPACE, not answerable to the SPACE Board of Directors. Right under SPACE's eyes, with the approval of the Board of Directors, Brown had set up a private trade association 'all his own.'

Bob Behar on this subject.

'Rick Brown tried to get the Board to create separate trade associations for all of the various groups in 1982. That failed and I thought it was a dead issue. But a year later we had Super Fund and Brown got what he wanted; a big dollar bank account which was no longer in public view.'

It was perhaps just a coincidence that when the SPACE elections were held this past fall, all but one of the then-active Super Fund backers ended up as SPACE directors in the pioneer category. Since

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the SPACE board was gerrymandered so that Pioneers dominate, and the Pioneers in turn are represented almost exclusively on the board by Super Fund member-supporters, the 'appearance' of predetermined control by a select few did not escape outside observers.

Schneider on that subject.

'It is very simple; **you pay to play**. You pay Rick Brown and you get what you want. Those who pay big bucks to Rick Brown get the control seats.'

The list of dissidents was growing. Early in the fall of 1983 there was a renewed awareness that not everyone backed Rick Brown, nor SPACE. That's when there was a particularly ugly incident involving one **Bill Young**.

Young first met Brown at the Minneapolis show in June of 1983. We arranged the meeting because we wanted Young's insurance program to bounce off **everyone** in the industry **who might have suggestions on how to make it better**. The two did not get on well, although on the surface the meeting seemed cordial enough.

Brown told me after the meeting, 'That is too expensive a program. We (meaning SPACE) can do it better and cheaper. **I have been working on an insurance program** for the dealers.' That was my first indication that Brown wanted SPACE to be in the insurance business. Hearing that, I understood some of the reserve I had noticed when Brown and Young were talking. Young, apparently, noticed it too.

'That didn't go well; he had very few suggestions or comments on how to make it better. My street instincts are that he felt threatened somehow by an industry wide insurance program. Did you notice it?'

SPACE did do something about insurance at their Minneapolis Board meeting; they instructed President Behar to look into available programs, to talk with insurance firms about providing dealers with **group** insurance. He was also told to 'look into' warranty programs. He did the latter with Bill Young since by now everyone knew Young was working hard on such a program.

When Young's program was ready, he wanted to introduce it at a trade show. The next show was Orlando. As I listened to the final program description, I instinctively knew that **this** was something very important for the industry. The insurance seemed to resolve some of the dealer warranty problems; but the financing was brand new. I spoke with Behar about getting a program slot for Young's announcement, feeling it was one of the **most newsworthy events of the year**. Behar agreed, and then Brown found out that Young was going to be on the program. A telephone call to me followed.

'We have done some checking on Mr. Young; it does not look good,' Brown said to me. I asked for an explanation.

Some years ago, Young's Maryland insurance firm had been **charged with** selling insurance contrary to Maryland State insurance laws. A pile of newspaper clippings following the hearing before the State Insurance Board was forwarded to me by Brown. A lengthy hearing before the State Insurance Commissioner followed. The transcript of that hearing, more than 150 pages, was also forwarded to me. I read them all. I especially read the last several pages where the insurance man that brought the charges broke down on the witness stand and admitted, **under oath**, that his business had been hurt by Young's business, and that he **'made up the charges and testimony he brought against Young's firm.'** The State Of Maryland found Young's firm not only **not guilty**, but would later note that Young's sales techniques became an industry 'standard' in the years that followed.

We were convinced that Young was not a bad guy. Brown was not.

'They drive around in Cadillacs,' he would observe, referring to Young's salesmen. 'Would you have one of **them** to your home for Sunday dinner?'

Brown did not give up on Young. **He wanted** Young's combination insurance/financing presentation **off** the Orlando program. Brown and another member of the SPACE Board traveled to Young's office. A several hour meeting followed, in which **Brown said that SPACE was going to get into the insurance business**. Having said that, Brown then wanted Young to tell the SPACE delegation 'How you have been able to get your own program cleared in all 48 states.' After the admission that Brown was heading for the insurance business, Young reflects, 'I was darned if I was going to tell him HOW we did this; we spent nearly \$100,000 in legal fees getting our program approved by the insurance commissioners in all of the states. **He wanted me** to tell

him HOW I did it, for free; so **he** could go in the insurance business! I was not about to do it.'

Brown took Young's reluctance to share 'trade secrets' as an attempt to 'hide' something about the program. He made it widely known that **he did not like Young** or his program, and actively worked to get the Board to cancel Young's appearance; right up to the day before it was scheduled.

Considerable hostility grew out of this one. Brown felt threatened. Young felt threatened. **Brown** lined up 'extract' copies of the same newspaper and Insurance Commission reprints which we had carefully studied. They were circulated, widely. **Young** put his own attorneys to work on Brown's background. They discovered the Suburban Cablevision link and other things which they felt were potential 'conflicts of interest.'

Journalist Lloyd Covens knew **something was up** as he made his rounds of the floor and suites at the Orlando SPACE show. The signs were unmistakable. He did some digging. And he came across several sets of papers, from both sides. He also talked with some other members of the Board who had their own reflections on Brown's activities. Covens had a story.

I learned about it also. Covens was already on record as feeling Brown was a hostage-holder; his infamous editorial of earlier in the fall said it strongly. I knew, as a fellow journalist, that Covens would release what he had. So I went to newly elected SPACE Board chairman **David Johnson** with what I knew. I made the suggestion that Johnson create a special select committee to openly investigate 'any and all allegations' against Brown, to clear the air once and for all. Johnson talked with fellow board member Peter Sutro and others to gather 'facts' and there was some discussion that the Board should ask Brown to temporarily 'step down' as VP and General Counsel of the trade association until the investigation was complete. That suggestion was discarded however and Johnson, on his way to Sri Lanka with the Arthur C. Clarke group, passed the baton to newly elected President Peter Dalton. Before Johnson left the states for those three weeks, he talked with Covens and **asked that no story be released** until the select committee had completed its investigation. 'Please don't try Brown in the press,' requested Johnson, 'because that will only make it more difficult for the committee to get all of the facts in an unbiased way.' Covens agreed.

When Johnson and I returned from Sri Lanka, the agreement between SPACE and STTI, now belabored far too long in the press, was falling apart. Eventually it did fall totally apart, after an abortive attempt to patch it up at the Las Vegas CES gathering early in January. The 'select committee' investigating the allegations against Brown seemed to have slipped through the cracks; in the press of straightening out the show mess, nobody seemed concerned about Brown's conflicts anymore.

Well, almost nobody. Schneider was tired of (as he put it) "... taking it on the chin and getting blamed for all of these problems." He filed a lawsuit against SPACE, **plus Brown and Dalton individually**. It appeared as if the suit was part of a 'first strike' strategy. Prior to Schneider actually filing **his suit**, the trade press had been reporting that **SPACE was going to sue STTI** and Schneider, and seek an injunction against STTI holding its own show in Vegas. That's when somebody 'noticed' that the attorneys being used by Schneider were the same attorneys previously used by SFPC's Bill Young, in Orlando, back in November.

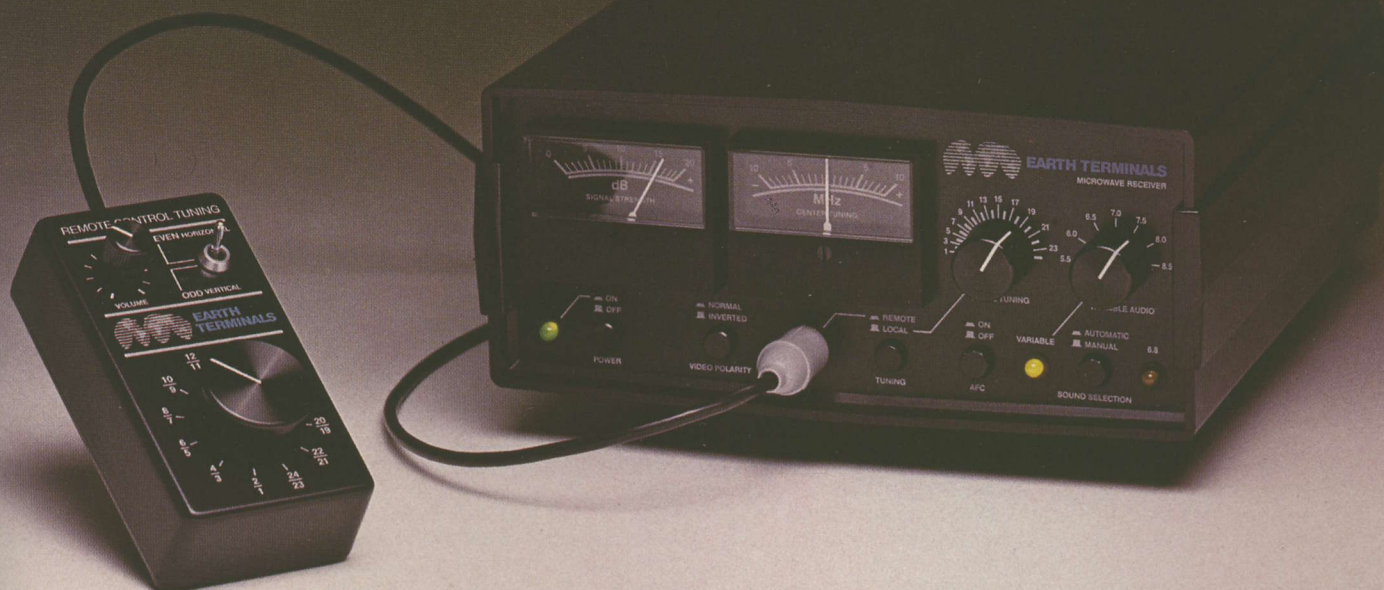
And that led to the suspicion that Young somehow was behind Schneider's 'get tough' attitude. Perhaps tired of the story, or because they feared confronting Young with the coincidence, the trade press left **this one** alone. It did not escape me, however. I asked Young how it happened.

'Schneider was worried sick and he was convinced, because SPACE news releases said so, that SPACE was going to sue him, and try to stop his March show. He asked me what I would do and I gave him two pieces of advice:

'The best defense is a strong offense, and, 'Here is the name of a law firm which I have great confidence in.

'Then I stepped back and out of it. I had no forewarning what they were going to do and it was not until after it happened that I learned, as did you, about the filing of the suit in Las Vegas.'

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Schneringer lost ground, and gained ground, in the Las Vegas confrontation. **Example of the former;** Taylor Howard has served Schneringer through the years as a defacto 'chairman Of The STTI Show Program Committee.' That meant Howard had a part in getting the Schneringer seminars on the stage. The blow-up between STTI and SPACE left Howard in the SPACE camp; Schneringer would no longer have (or perhaps wish) the 'services' of Howard at future STTI trade shows.

An example of the latter. Several exhibitors had canceled when they learned, **last November**, that STTI and SPACE would be doing a 'joint show.' When STTI was back doing it alone, they re-signed-up for the STTI show. They voiced a strong emotional feeling against SPACE and anything 'involving Brown.' There's that division in the ranks again.

The battle of the exhibits, who was going to exhibit at which show, will continue right up to show time. They seem to fall into three distinct, and not surprising, camps.

- 1) They will exhibit ONLY at the SPACE show (i.e. KLM, and others);
- 2) They will exhibit ONLY at the STTI show (i.e. Jensen, and others);
- 3) They will exhibit at both (i.e. Echosphere, and others).

At press time, Uniden has elected to exhibit only at the STTI show. At least one major industry firm would exhibit at both, but would withhold unveiling of a major new product until the STTI 'portion' of trade-show-week. The announced booth counts clearly show that STTI was 'ahead' in the booth department; perhaps by a 30% or better margin. With every one 'fluid' and 'jumpy,' final decisions in some cases would wait until days, perhaps hours, of the opening of the SPACE show (it comes up first; March 18-20 while STTI follows March 20-22).

But I digress.

The basic industry division, many maintain, is Brown. It is a combination of his 'attitude' say some, his 'personality' say others, and his 'hunger to make money' add others. Within the Board there is very little caucusing without Brown. No important meetings are held without him; small groups of Board members, discussing Brown, always seem to meet in out of the way places at trade shows. And they look over their shoulders alot.

'What does he have on you?' asked one concerned manufacturer. 'Why don't you speak up, like you do on every other subject? Does he have something on everyone on the board?' Sound questions. There are few sound answers.

Former SPACE President **Tom Humphries** (he followed Taylor Howard in the President's chair) recalls 'Several times when I was president, there were groups or two or three members of the board who went into a board meeting vowing to call Brown on the carpet over this issue or that issue. I waited and I waited for something to happen. It never did. I never understood why.'

Facing Brown is an intimidating experience for many. He is bright. Very bright. His strongest talent is his ability to strategize, work out ways to surround an enemy and then pull the plug when he has a guy in a corner. That frightens people. That intimidates people. Most people have considerable respect for Brown's abilities in this area. Some of that respect is fear.

Schneringer is not frightened by Brown. 'I cannot believe he gets away with so much. First he told the board he would take a walk if they didn't pay him what he was demanding. He got SPACE into the publishing business, into the show business, into the T shirt business. He wants to get SPACE into the insurance business and the financing business. He even wants SPACE to be a 'partner' of Showtime or HBO, or both, in the movie distribution business. Is there no end to this? Will SPACE be manufacturing or distributing earth stations next?'

Through the years of 'growing up,' there have been those who would have voted to curtail Brown's powers had they been given the opportunity. The list of such a group is by no means an 'enemy list' in the classic 'Nixon Enemy List' format of recent history. But if a majority of those who feel this way ever got onto the Board, Brown's headstrong running of SPACE would be over. Some are obvious because they have stood up to Brown, or a SPACE-dominated-by-Brown, in public, on one or more occasions. Taylor Howard would be

on that list, inspite of his recent posture in the negotiations with Schneringer. **Guy Davis** of Uniden would be on that list. **Ed Grotzky** of Arunta would be on that list. So would Dave McClaskey of Intersat and Peter Suro of Patmar Technologies. **Randall Odom** of Odom Antennas would make the list, in his quiet way. **Doug Dehnert** of USS would change the way things are done, if he had the chance. **There are many others who would gulp and head for a Bromo Seltzer if they saw their names here.**

Schneringer and others maintain that there is ample reason for change. They suggest that even when there is the 'appearance of conflict' the SPACE board should be bending over backwards, in the interest of industry harmony, to clear up those situations. When SPACE continues to be dominated by the select Pioneer group, inspite of evidence which suggests dealer members as a distinctly different category contribute at least as much per year in direct dues, **there is the appearance of conflict.** When a select committee sets out to investigate a list of allegations against Brown, personally, and never formally meets to consider the charges nor releases its findings, **there is the appearance of conflict.** When Brown's law firm represents a client who is diametrically opposed to what the majority of SPACE members believe is the best interests of SPACE members, and Brown files a piece of paper at the FCC taking his non-SPACE-client's position, with SPACE's name on it, **there is the appearance of conflict.** When the SPACE Board decides to hire a General Manager, who will report directly to the Board and not to Brown, and the whole effort drags on for 8 months or so and no General Manager is found and Brown urges that the position be split into two lower level posts which answer to him, **there is the appearance of conflict.** When Brown maintains high level contact with HBO and Showtime, but reports none of his negotiations to the SPACE Board, **there is the appearance of conflict.** When Schneringer sues SPACE, plus Brown and Dalton personally, and legal funds to defend Dalton and Brown personally come out of SPACE funds, **there is the appearance of conflict.**

When Brown's office arranges trade show deals with hotels which include 'kick backs' to SPACE for overpriced hotel rooms at the host hotel, **there is the appearance of conflict.** When SPACE has only two employees, on salary, and virtually all of the rest of the money goes to Brown and Finn or to suppliers solely contracted for by Brown and Finn, and there are no checks and balances built into approve this spending at the Board, **there is the appearance of conflict.**

As more and more industry people learn of these incidents, there is a growing division within the ranks. And SPACE, all of SPACE, suffers because of the 'appearance' that Brown and staff, not the elected Board nor the elected officers, is in total control.

The issues cited here are real, and they will not go away without a proper hearing. SPACE began an interesting process during CES Las Vegas; **they opened up their Board of Directors meeting** to members, the press, and the public. SPACE will hold another meeting of the Board in Las Vegas during the SPACE show. It would serve us all well if that procedure was continued, and if the meeting room was jammed to capacity with concerned members of the industry.

POST Script One

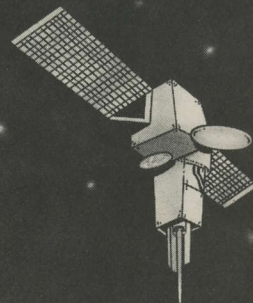
My Comments in February regarding why I, personally, could not have voted to (1) 'sue' STTI/Schneringer, and (2) rush together a SPACE trade show in Las Vegas during March drew the expected responses. In Vancouver, during the Expo there, I talked with SPACE President **Peter Dalton** and SPACE Chairman **David Johnson** about my position. Dalton thought I might have overlooked some of the financial considerations. He felt that my comments drew the conclusion that Schneringer would be 'giving up' more than \$600,000, out of his own pocket, to SPACE. He suggested I re-do the mathematics. Let's do it together.

The concept was that Schneringer would 'lose no money' by combining trade shows with SPACE. How was this possible?'

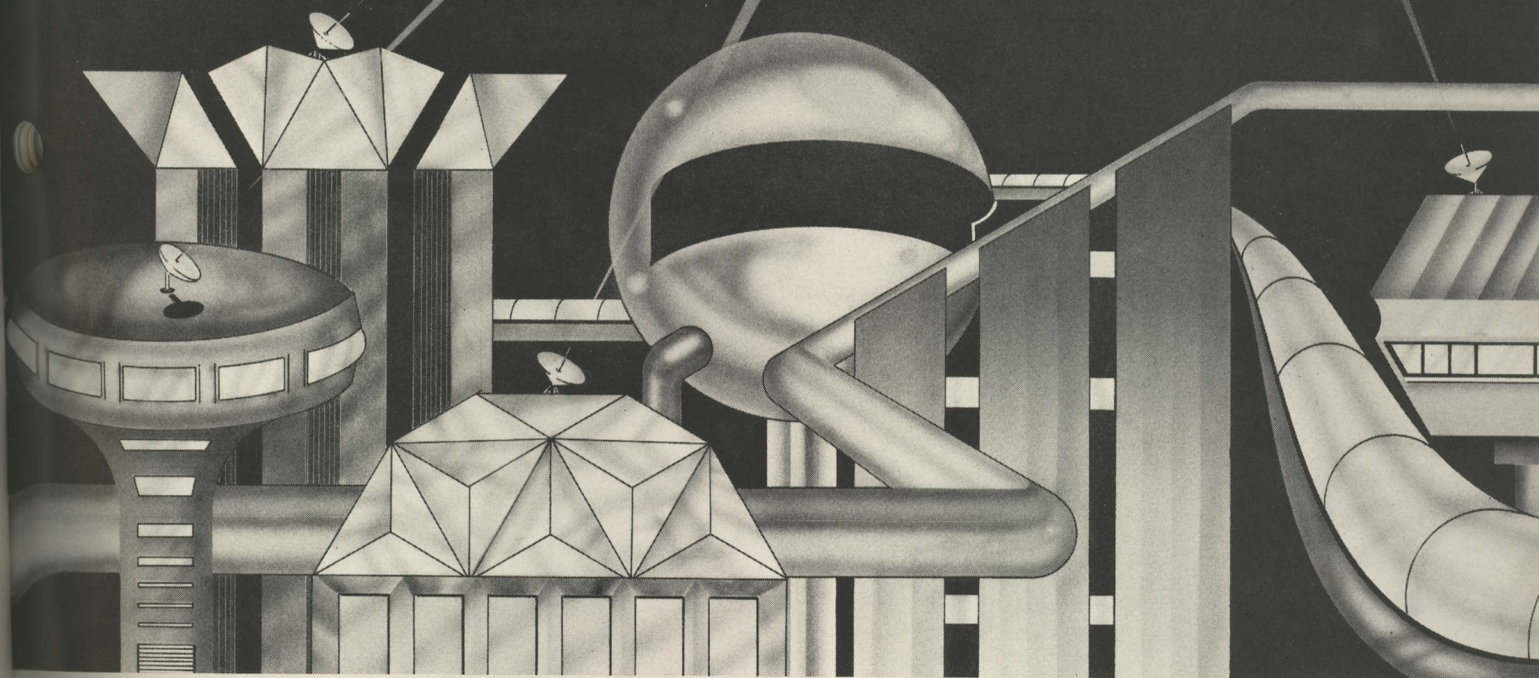
- 1) **STTI booth spaces** sell for \$650/675. By raising the prices (STTI settled on \$1050 but others had suggested \$1150), the increase in booth prices (paid by exhibitors) was supposed to offset the SPACE share of the joint show 'take.'

If there are **300** booths sold, at \$1050 each, we have a per-show gross income of \$315,000 for booth sales. The same 300 booths at

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\$650 each would have grossed \$195,000. **The difference is \$120,000.**

2) If there were **400** booths sold, with the same numbers, **the difference figure would be \$160,000.**

If there are three joint shows per year, we have either \$120,000 x 3 (\$360,000) or \$160,000 x 3 (\$480,000) 'extra gross income' which could go towards SPACE.

Or, if there are four joint shows per year, we would have either 4 x \$120,000 (\$480,000) or 4 x \$160,000 (\$640,000) to offset the 'SPACE Guarantee.' It is clear to me that STTI/SPACE **had to do** a full **four** shows per year at **400 booths** (paid), minimum each, for STTI to come out 'the same' as they would if they maintained a \$650 per booth charge and ran along at fewer shows per year.

On top of this, we had SPACE earmarked for 25% of the 'gate' (entrance receipts) at the shows (3 or 4) and that testy \$15,000 per show 'political fund' SPACE wished for bringing big names on board.

Dalton suggested that STTI was not going to spend any money. After we reviewed the numbers, it was apparent at least to me that while Schneringer/STTI was certainly **not giving up** \$600,000 (plus), as Schneringer suggests, he was bound to give up something in excess of \$200,000 of his own money. And to do that, he was going to have to manage to bring in 400 (plus) booths at four shows per year. It didn't look feasible to me; the industry is barely able to support three STTI and one SPACE show per year now; four full-blown **SPACE + STTI** shows seemed like a formidable hurdle to me. Add to that two Canadian shows per year, a few regional shows, and you have a show schedule that rivals the Barnum and Bailey Circus.

Schneringer maintains that he was 'assured' that by raising his booth prices and doing 4 shows per year, he would not be giving up any 'real' money. It is apparent to me that he was going to give up **lots of real money** in the best case, and possibly be stuck with a 'guarantee to SPACE' which could put him out of business.

POST Script Two

I thought that the lawsuit was the final shoe dropping; that with STTI lodging suit against SPACE (plus Brown and Dalton), and, the 'trio' of defendants responding, we would somehow coast to the twin shows. **I was wrong.**

STTI's attorneys next discovered that SPACE had lost its corporate charter with the District of Columbia, way back in September of 1982. It happened in this way. Brown moved offices. The post office forwarded mail for six months and then stopped. When the District sent Brown a renewal notice on the SPACE corporate charter, it never reached Brown. This happened two years in a row and under DC law, a corporation 'dies' when this happens twice. Brown and office never missed the notice, which involves a \$24 a year (revenue raising) fee and an unsophisticated single sheet form.

STTI then filed with the District to 'reserve' the name 'SPACE' for itself. In other words, STTI (Schneringer) wanted to 'own' the rights to SPACE. Under DC law you can 'request' (as in reserve) a name not **currently** in use, and even file corporate papers in that name. But no instant determination is made at that time of whether or not you can have that name.

The 'oversight' came to Brown's attention. An application to re-instate, **without penalty**, SPACE as a DC corporation was filed. It was accepted and SPACE within days was back in business in good standing in the District of Columbia.

Word that SPACE was no longer SPACE, that Rick Schneringer 'owned SPACE', spread worldwide. Well, as far as Vancouver, anyhow. With it came 'word' that SPACE had lost its Internal Revenue Service 'tax free status' since it had lost its corporate status. We checked on this and found SPACE's non-profit status (under IRS section 501(C6)) was never in danger. SPACE could have been a partnership or a sole proprietorship or any combination thereof and it would not have affected the IRS status. IRS rules are totally separate from District of Columbia rules.

Stories proliferated that members of the Board **were not** members of the Board; that officers **were not** officers, since SPACE (the corporation) was **not a corporation**. Were Board Members and Officers 'personally liable' for actions taken by SPACE (the trade 'group') between September 13, 1982 and January 31, 1984? Brown. **"The re-instatement of SPACE as a corporation in the District included**

making it retroactive to the lapse date. There is no liability to anyone; it is as if it never happened."

Schneringer's attorneys stirred up another hornet's nest. SPACE had no 'legal right,' outside of DC, to the name 'SPACE.' SPACE, the story went, had applied for trademark (name and mark) registration with the federal government . . . and been turned down. We looked into that.

SPACE had requested registration for (1) SPACE, (2) Society (for) Private And Commercial Earth (terminals), and, (3) a SPACE 'logomark.' It had been turned down because the registration folks decided 'SPACE' or 'Space' was a **generic** term; space (any space; deep space, near space, you-name-it-space) was not capable of being 'trade marked.' A big deal? Brown again. **"We will appeal the decision. It is not a life and death matter; we have rights to the name under 'common law' simply because we were the first to use it, and because our use of it has been continuous."** Would the courts allow someone else, say Schneringer, to use it? Brown once again. **"Absolutely no way!"**

A(nother) 'personal attack' on Brown. Schneringer's attorneys discovered evidence which they claimed 'proved' that Brown had not followed federal 'Lobbyist Registration Laws.' A person who 'lobbies' (i.e. works for the passage of a particular piece of legislation) is required to file a 'Lobby Report' during or immediately after a 'Lobbying Effort.' The report is supposed to list what expenses you had in that lobbying effort; where you spent money. It was claimed that Brown did not 'always do this' and some lobbying of the Waxman Bill in particular was done by Brown; and no report was filed. Brown on this one.

"To the best of my knowledge, appropriate reports have been filed in all instances where I acted as a lobbyist."

All of this (and more) came out when Schneringer sent massive piles of papers to virtually every trade publication in the land (**CSD excepted**) on February 1st. Inside were copies of SPACE's loss of corporate status, the 'reservation' of the SPACE name by Schneringer and much more. At about the same time, SPACE's attorneys had answered the original Schneringer/STTI suit with a counter-claim. In that counter-claim (suit), SPACE and Brown seek some damages from STTI. They are asking the court for \$1,000,000 for 'Breach of Contract,' **or**, \$500,000 for 'unjust enrichment' because they allege STTI/Schneringer broke a 'Quasi Contract' (i.e. verbal agreement backed up by specific actions), **or**, \$1,000,000 for 'fraud and misrepresentation.' The counter (suit) makes the point that STTI/Schneringer brought the original suit because 'Schneringer wished to force SPACE/(Brown) out of the show business.'

Brown characterizes all of this as:

"... designed to thwart the will of the (SPACE) Board of Directors and the vast majority of this industry in carrying out the functions necessary for preserving of our legal right to exist, and, the good name of the industry . . ."

Privately, Brown feels that it is **he**, not SPACE, which Schneringer is after and that if he were not there, Schneringer's posture might not be so aggressive. At the same time, he feels certain that SPACE, as a trade association through its elected Board, would continue to operate trade shows 'at least twice per year' **even if he** was not serving in his present capacity because "... we have proven that the trade shows perform three very valuable functions for SPACE. They educate. They provide a much needed political forum, and, they have the capacity to generate revenue which in turn can be used by SPACE to further the goals of the industry . . .".

POST Script Three

Lest there be ANY confusion concerning what you have just read, I will state here quite clearly that I am **NOT** calling for the resignation of Rick Brown. Nor am I calling for Board action to censor or fire Mr. Brown. **What I am suggesting** is that the industry is in the worst sort of turmoil, internally dividing us at a time when we need the combined strength of unity. At least a major portion of this turmoil centers around allegations that Brown is running SPACE for his own reward. The common sense approach to clearing this up, once and for all, is to insist that SPACE face these issues, deal with them, and then move on, united as a whole industry, to the challenges that are here and coming. We should not, as an industry, further tolerate fragmentation

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created by rumors, innuendo and unsubstantiated stories. **The time for decisive action is now** and the March show-period, when we next assemble as a group, presents an excellent opportunity to get the applecart righted once again.

THE C-SPACE Difference

If there are questionable priorities, and loose checks and balances in the U.S. SPACE trade association, there are 'other' problems facing the smaller and less organized Canadian SPACE (C-SPACE) organization. At first blush, C-SPACE looks like a 'poor cousin' to the U.S. SPACE. A 29 year old New Zealander transplanted to Canada named **Chris Budd** is the **Executive VP** of the trade association. Budd lives (and C-SPACE therefore headquarters) in Saskatchewan. **Budd is not an attorney.** His background is in two areas; marketing, and, politics. Budd to date has largely donated his time and his own money to make C-SPACE run. With approximately \$4,000 coming 'in' over the past 12 months, and more than \$12,000 going 'out,' the \$8,000 deficit has come out of Budd's pocket. Operating expenses, at \$1,000 per month and no salary, are 'bare bones.' U.S. trade association participants would possibly dismiss C-SPACE as ineffective and underfunded. It has not been ineffective.

"For the past two years, this industry has been skirting on the very edge of illegality." Speaking is **George Davies**, Director of Space Applications, the (federal) Department of Communications. Davies and two other Ottawa bureaucrat-types have just finished a marathon 3 hour panel discussion and floor debate at the Vancouver Canadian Satellite Expo. Davies takes his finger and draws a small arc on the tablecloth in front of him as he speaks. "Often, it has been **Mr. Budd who has kept this industry on the proper side of this line.**" Budd has been forced, by finances and an apprehensive and perhaps unstable dealer system in Canada, to go it alone the majority of the time. He has made it his duty to know as many political types as possible. He harps on three themes:

- 1) The satellite industry is providing much needed jobs in Canada (unemployment is more than 3 points over U.S. rates);
- 2) In Canada's rural areas, and that includes a big percentage of



CHRIS BUDD, VP and prime mover in the Canadian C-SPACE project, worries that recent revelations concerning problems in the American 'SPACE movement' may spill over into Canada.

the nation, satellite reception comes close to being a necessity. In fact, a British Columbia county-like region is buying more than 5,000 TVROs **out of county tax funds**; perhaps the largest one-time retail purchase of TVROs in the history of the world. In that part of Canada, **every home** will have a TVRO!

3) Satellites are fast becoming man's number one tool to attack social ills such as illiteracy and health care. "**Canada,**" Budd expounds, "**has the tools in place to lead the world in communications.**"

Canadian politics, to a non-Canadian, seem 'intensive.' Canadian industry 'openly courts' one political party, or another; and vice-versa. American industrial support for political parties is far less 'overt.'

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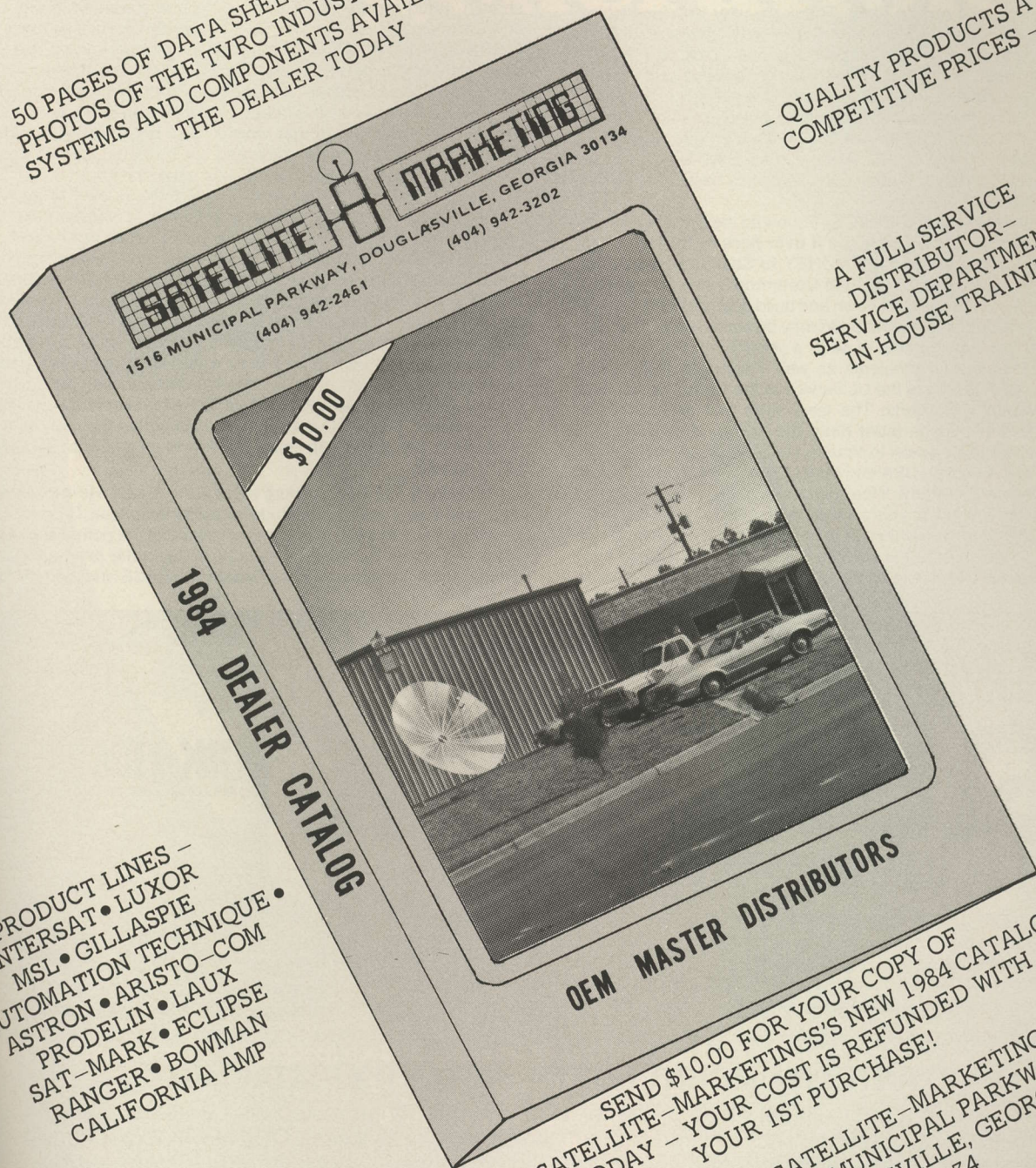
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C-SPACE has attracted some attention in the government circles by being vocally supportive of a political party. Budd suspects that a trio of Revenue-Canada (tax) audits of his affairs may have been politically inspired, during 1983.

Not having any money, and being in debt as of February 1st to the tune of twice what the organization took in during 1983, does not worry Budd that much. His primary goal during 1984 is to unite the industry's dealers, distributors and manufacturers into a cohesive political force. **It will not be easy.** There are very few 'friendships' within the Canadian TVRO industry. Competitive antenna suppliers do NOT talk with one another. Competitive dealers avoid one another, even on the street. "It has been a back biting, highly volatile industry from the very beginning" notes Doug Saxson, a pioneer in the Canadian TVRO scene. Budd is asking these people who by and large do not **trust** one another, seldom **talk** to one another, and never have **worked** together on ANYTHING, to support a single, 'National' trade association. Budd's task is further complicated by basic political division within Canada.

"**You want me to join C-SPACE?**" shouted the British Columbia dealer indignantly. "**Well, you move it over here to BC then; I am certainly not going to send MY MONEY to Saskatchewan when MY PROBLEMS are here, in British Columbia!**" And so it goes, a dealer at a time, Budd has to sit down and build dealer confidence and often battle with dealer fears that Budd may be some sort of charlatan scheming to fast talk them out of \$200 a year(*).

C-SPACE has other problems as well. Foremost, there is the 'CSA' issue. **CSA** is akin to the UL service in the United States; with some noteworthy exceptions. The laws state that **any electrical appliance** sold in Canada **must have the approval of CSA.** This authority extends to the power to actually stop a shipment of American electronics at the border. CSA can direct Canadian Customs to turn back the shipment, or seize it. If the shipment is seized, the goods may sit in storage for months or years awaiting resolution of the problem.

CSA has far more power than that, however. Let's say they decide a particular model or brand of satellite receiver is 'dangerous.' They have the power to march into dealer showrooms and warehouses all

over Canada, without notice, and confiscate the equipment. That has happened before; it has taken as long as four years to get the goods released. You can imagine what might happen to a dealer if he had **all of his inventory** grabbed and then had to wait 4 years to get it back!

Budd and many others within the Canadian TVRO industry worry alot about when there will be the 'first building fire' that can be traced to a faulty piece of TVRO equipment. CSA is aware of the TVRO industry (**R.L. Drake has obtained CSA approval**; others **say** they are or will shortly). Budd recalls one CSA inspector who wanted to close the borders to a particular brand of TVRO receiver this past summer. He, **C-SPACE**, intervened and pleaded that the product involved be given some extra time to get its act together. Budd did this at the request of a Canadian 'dealer member,' who had put up-front money for a considerable shipment of the product. Had the units been stopped and held at the border, **the dealer would have been out of business.** The US supplier had **his** money, and could not be counted upon to help get the receivers out of the confiscated state.

There is one more 'CSA concern.' If there is ever a fire which investigation reveals **was caused** by a mal-functioning piece of TVRO gear, and that unit did not have CSA approval, there is a regulation in Canada which automatically revokes the householder's insurance. In other words, a properly insured building **can become an uninsured building** if there is a fire traced to a non-CSA-approved piece of equipment. The intent here is to help insurance firms cut losses because of poorly designed equipment. The supposition is that should an insured house burn and should a non-CSA approved piece of equipment be proven at fault, the poor homeowner who lost the house, **and their insurance coverage**, will immediately turn to the TVRO dealer, the TVRO distributor who imported the non-approved equipment, and if they can figure out how to do it, to the OEM (in the USA) as well.

Budd feels this is powder keg with a burning fuse. He is incensed at the "**don't bug me . . .**" attitude of those American OEMs he has approached in an effort to make them aware of the potential problem. He is also upset because he says he brought the full details of the problem to the attention of **Rick Brown** at SPACE and then, as far as

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Budd can tell, SPACE did nothing to alert its members.

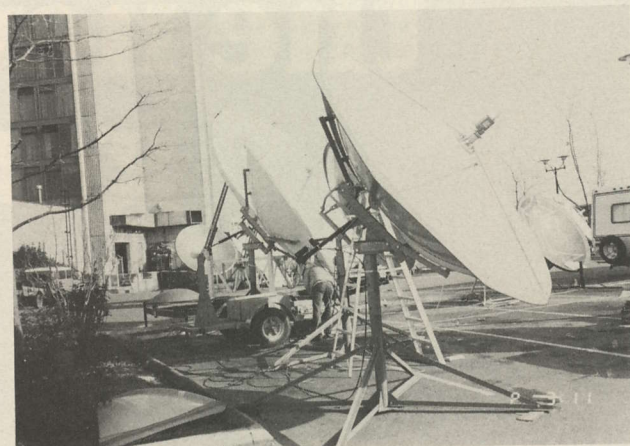
Budd's CSA problem is not restricted to American firms that import into Canada. **Virtually none of the Canadian hardware suppliers have bothered to qualify for CSA approval either.** "There is a 'It can't happen to me' attitude here which I do not understand. The manufacturers seem to be so sure that they cannot get hurt that they continue to pump out equipment without even taking the most elementary precautions to protect themselves."

Budd's approach to running a trade association is vastly different from Brown's. In fact, Budd prefers to characterize C-SPACE as a 'lobbying' group rather than a trade association. "A trade association suggests to us that we exist solely for the benefits of the 'commercial members' of the 'trade,'" reflects Budd. "Our goal is to represent **everyone** with an interest in TVRO, but to concentrate on the needs of the end user. If you watch out for **their** interests, everything else will fall into place for the dealers and distributors and OEMs."

At the moment, because the Canadian dealer is so dependent upon the American OEM or distributor, there is an undercurrent of 'reluctant acceptance' of American products. Canadian dealers tend to be very savvy and anxious to get the best equipment bargains. **The line between dealer and distributor is not that precise in Canada; virtually every dealer 'pretends' he is a distributor at some point.** This confuses the OEMs who ponder how a region ('Canada') can have 'so many distributors and so few dealers!'

The Canadian TVRO industry is in a year of dramatic transition. Canada's C-SPACE is fighting for survival and identity in a marketplace where people are more apt to 'shout-at' each other than 'talk-with' one another. Budd knew this was do or die year, as it started. What he did not know was that the U.S. version was going to spend at least part of 1984 'throwing up on itself.' "God, I hope they straighten out that mess in a hurry" worries Budd; "not only is what is happening bad for the industry as a whole, but it will probably start a rhubarb up here as well. I wonder if I can 'sue SPACE' for

*/ C-SPACE: (306/352-8454), or, (306/543-3322); 199 North Leonard, Regina, Saskatchewan, Canada S4N 5X5.



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defamation of character, by association!'" Chris Budd many have to stand in line.

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SATELLITE RECEPTION SYSTEMS

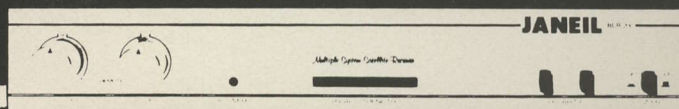
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CRTC'S COLIN NELSON (left), **George Davies of the Department of Communications** (seated, on right) attempted to fashion a new Canadian TVRO policy with plenty of input from the crowd.

his home in Canada's Yukon in 1977. Official government 'policy' has changed seemingly by the hour. From within Canada, keeping up with those changes has been frustrating. From outside looking in, following the changes has been a comic soap-opera. Canadian TVRO entrepreneur **Doug(las) Saxon** attended the first SPTS/STT gathering in the summer of 1979. He was instantly hooked on TVROs and has been supplying them in Canada (**Nu West Video, Ltd.**) since that time. Doug's firm is one of the pioneering firms in Canada and through the years he and his people have installed thousands of terminals over a big chunk of Canada. More recently Saxon began publishing **GALAXY Guide**, a Canadian satellite TV guide.

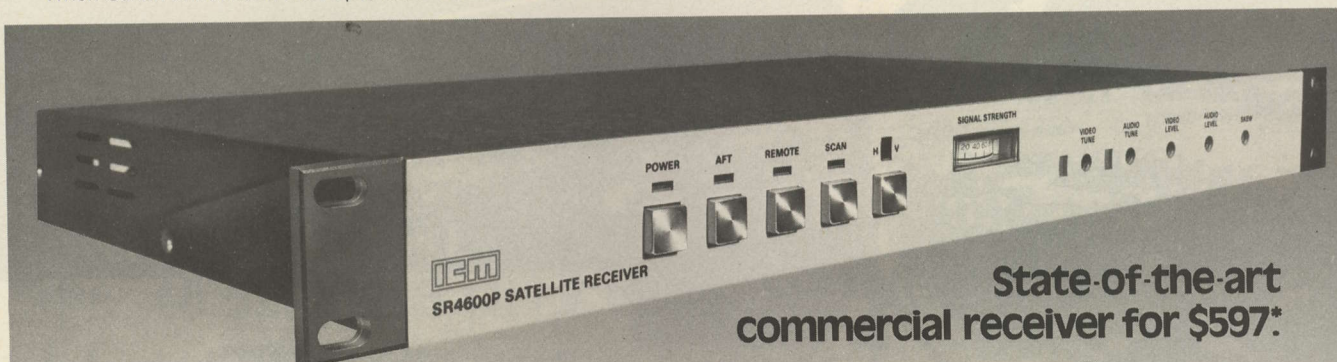
When Saxon announced the Expo, there was an instant clamor.

"How can we support Expo," many wondered, "since we are in 'competition' with **Nu West** in our own retail and wholesale operations"? Saxon has had something of the same problem with his **GALAXY Guide**; although a Canadian created guide is much needed, his equipment competitors in the field have been reluctant to push it, or support it with advertising; fearful that in doing so they would be supporting their own demise.

Saxon gets very high marks for making Expo not only work, but also for keeping it very neutral for his own business interests. A lesser man would have given into the temptation to slide his retail and wholesale and 'Guide' operations into the forefront of the Expo. Many of the exhibitors we talked with were still apprehensive about Doug's competitive posture even as the show opened. It would turn out they had nothing to fear; it was difficult to even determine that Doug had any interest other than the 'Expo' itself from the printed program, the events on the program, or the exhibit halls.

Saxon did align himself, for the creation of the seminar sessions, with **C-SPACE**, the Canadian 'lobbying group' for the home TVRO industry. That turned out to be one of those 'better ideas' since **C-SPACE's Chris Budd** was able to get some very important people to appear on the program. With the help of '21st Century Media's' **Frank Ogden**, Budd lined up people such as **Colin Ross Nelson** of the Canadian Radio-Television and Telecommunications Commission, and **George Davies** of the Department of Communications. The CRTC/DOC 'feds' had never appeared in any type of TVRO forum previously and to get them 'on stage' for a one hour scheduled open discussion of 'just how legal are TVROs, anyhow?' proved to be a history marking event. The session was 'electric,' **stretched to three full hours**, and then had to be forcefully shut down because of the press of other events; it did not run out of steam on its own.

Saxon, in his wildest dreams, hoped that the 'Expo' would bring the Canadian industry 'closer together.' His imagination did not stretch to the creation at 'Expo' of perhaps major, new, Federal Policy relating to TVROs. Yet, that is precisely what did happen as the three hour session included open give and take between the regulators, the unregulated TVRO system sellers and operators, and even the cable



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CLAIMS for more than 100 TVRO antennas in the parking lot at the Delta River Inn.

television industry. In the whole of the Canadian telecommunications scheme, perhaps only the broadcasters were not properly and adequately represented. This was the kind of session that will be remembered in years ahead as 'precedent setting,' and pivotal in establishing ground rules for an entire, new industry.

There is a battle in Canada between the Federal Regulators/policy makers and the Provincial Regulators/policy makers. Nowhere in Canada are the 'battle lines' more clearly drawn than in British Columbia. The BC policy is set by **Dr. Pat McGeer** through a Provincial department he runs. McGeer opened the Expo's sessions by repeating the kind of message that has endeared him to a major chunk of British Columbia's residents. **"The open sky policy of British Columbia could, and should, be a model for all of mankind,"** he reasoned. During a period when Federal Canadian policy has been at

best unclear as relates to TVROs, BC policy has been unswerving. McGeer and his office would 'protect' people or firms using TVROs from 'the Feds' and indeed recently began licensing SMATV terminal system operations within the province in defiance of federal regulations. McGeer clearly is a 'folk hero' in Western Canada, and he probably made the federal people at 'Expo' more than slightly nervous.

In the "what's new" department, there was the unannounced-in-advance appearance of **Scientific-Atlanta** (Canada) at Expo. Old timers may recall that S/A first displayed at the 1979 Oklahoma 'first' show of the American industry. That was their only entrance into the home TVRO industry, directly (although more recently they have sold home terminals to Heathkit). In **Canada**, they are planning to re-enter the home system marketplace and they have set their sights on capturing as much as 30% of the marketplace there. We talked at length with the trio of S/A folks on hand to see what their plans and products amounted to.

They will have dishes in the 8, 10 and possibly 12 foot region. The dish products will be standard S/A packages, already available (if you are willing to pay the price) within the USA. They will have a trio of receivers, one of which was on display in Vancouver. They, like Japan's Uniden, intend to 'span' the price-sensitive marketplace with receivers that end up with a top end unit which controls both the receiver and the dish from an IR remote in the consumer's hand.

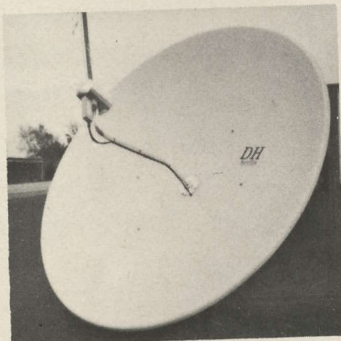
The LNA and polarization rotation package is still up in the air. Don't be surprised if it turns out to be a 30 dB/40 dB gain package, however. They seem to be leaning towards a single conversion approach, using high quality down converter techniques thereby reducing the gain requirements for the LNA proper.

If the **complete** package is not cast in concrete, yet, the selling approach is. S/A (**Canada**) will sell directly to dealers; only. There will be no distributors in their plan and dealers will get massive amounts of field and hands-on training in the process. S/A is taking 'the high road' approach to selling and packaging home TVRO systems and their packages will not be 'cheap.' They may not be considered 'competitive' by many, but S/A is convinced that there is a substantial 'nitch'

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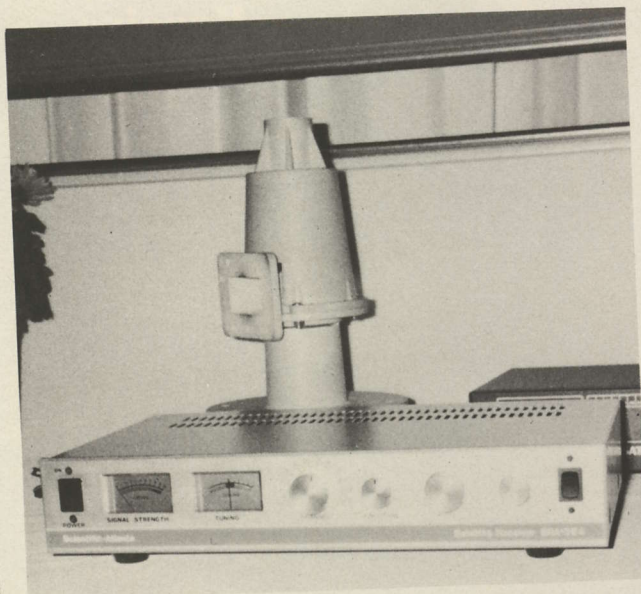
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S/A's level-two home TVRO receiver has attractive front panel styling.

remaining for high grade, very rugged home terminal systems; especially in Canada where the weather takes a high annual toll on inadequately designed and poorly installed home systems.

The majority of the Canadian show-product was American built and American produced. A few Canadian firms are starting to get off the ground with receivers and one boasted to us that they will be shipping as many as 1,000 receivers per month by May. Canadian customs continues to be a hassle for anyone bringing in American

produced goods; more than one American exhibitor had either literature or equipment 'seized' at the border of his way to the show. Those that 'drove in' rather than flying in seemed to fare better in this respect; a note for future consideration.

Canada's biggest problem at the moment is establishing its own unique 'identity' within the TVRO worldwide industry. Most knowledgeable observers feel there are around 30,000 home terminals in Canada at the present time. The same people see Canada's market as being perhaps 10% of the U.S. market during 1984. This suggests that the number of Canadian terminals will more than double during 1984. Up to this point, Canada's hardware and operations have been knee-jerk responsive to what was happening within the USA. The first signs that Canada will be carving out its own niche and determining its own destiny in the future were evident all over 'Expo.' If there are internal conflicts within Canada over just about everything else, there is at least a majority view that Canada will be best served if its TVRO industry is able to stand on its own two feet, separate from the American 'example' and problems. Doug Saxon made it happen February 3/4 and 5 and he plans to do it again in early August in the Toronto area. A tip of the CSD hat to Saxon, his crew, and the entire Canadian TVRO industry for a job 'well done.'

ENDING Another 'Conflict'

When I launched our middle of the month publication last August, I noted that I was pleased to have Mr. Larry James of Patmar Technologies working with me to create the **Cooper/James Report**. 'CJR,' as it is abbreviated, is a dealer formatted publication which goes to all SPACE dealer members (we contribute this to SPACE because we feel strongly that dealers must be better served to justify their being members of SPACE), and perhaps a thousand others throughout the industry.

When within sixty days Larry James had resigned from Patmar and was Vice President at Satellite Financial Planning Corporation, I made the further announcement that if there developed conflict between Larry's new job and his writing and reporting responsibilities with CJR, I would have to figure out some other way to 'spell CJR.'

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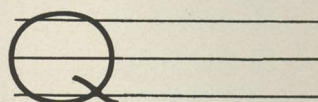
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In the interim months, October through January, Larry went from co-authoring at least half of the CJR material per month to contributing between 0% and 10% of the content. I shouldered the extra load, found another few hours in my day, and decided to see if this might turn around.

When there developed a substantial rhubarb between Larry's employer Bill Young and SPACE, surrounding the Orlando show, I was repeatedly asked 'how much longer will Larry have anything to do with CJR?'; the implication being that Larry's SFPC jobs was indeed 'in conflict with' CJR.

I felt Larry was the victim of circumstances far beyond his own control; Larry's employer did not start the battle with SFPC, it started on the other side. I hoped it would all blow over. As you are aware, having read my analysis of the present status of the show battles just preceding this, it did not blow over and in fact appears to be headed for a blow up.

Also in the interim, the success and growth of the SFPC program has been phenomenal. The staff processing TVRO dealer loan applications now numbers more than two dozen people. There is no 'lax time.' There are computer terminals and multi-line 800 number telephones all over a sprawling office complex that seems to double in size each month. Larry's job responsibilities enlarges daily; he suggests it squares each hour. There is only so much time to work and Larry has been on 18 hour days seven days a week for months. Clearly, there was and is a substantial 'time conflict' here which Larry cannot control.

So between the 'appearance' of conflict between Larry James/financial administrator, and Larry James/co-editor for CJR; and, not enough time in the month to do both, it was apparent to me by January that I could forget about spelling CJR as C J R any longer.

The recent February issue of CJR was the last. It was still spelled C J R but we mysteriously left out any explanation of why it was spelled that way. That was to give me sufficient time to restructure the format of the publication.

The next issue of CJR will be spelled '**CSD/2.**' I have to give Ted Turner credit for the inspiration. CNN/2 is not a bad model to follow.

CNN is the **major** news reporting service. It brings in-depth reports on just about everything going in the world. **CNN/2** is the **abbreviated**, capsule form of the world's important events, done so that a busy viewer can catch up on things that will change his life, in 30 minutes time. Not a bad concept, as we all know.

CSD is the grandfather of all industry publications. In our time we have covered everything of any consequence, and a fair amount that never amounted to a hill of beans. In the **past** there have been some dry 'news months' in our small industry. If I have been asked once, I have been asked a thousand times to make **CSD** 'come out' more often. A few crazy people have been asking me to do it **weekly!** Certainly the industry is growing up; there is far more news and far more in-depth material to work with today than we had say just a year or two ago. So why not split the difference? Why not make **CSD** come out **twice per month**, say every second week? And why not call it **CSD** (first of the month) and **CSD/2** (middle of the month)?

Having tentatively decided to do just this, the next trick was to format the twin issues so they did not look like twins. Keep each distinct, but give them some continuity so they represented a 'family' of publications. The one nifty technique we had made work with CJR was the quick turn around time. I placed the last material on the paste up flat on the morning of the 12th; the printer gave the completed publication to our mailing service before noon on the 15th. By the morning of the 16th, readers in the first couple of postal zones were reading it. Not quite a newspaper, but close.

The next problem facing me was how to integrate the subscriptions. The common sense solution, although perhaps not the best business approach, was to simply **send CSD/2 to everyone** who is now receiving CSD and then in the future adjust the subscription rate for the '24 issues of CSD-CSD/2 per year' upwards. With one exception, that was done. Effective with the March issue of CSD/2, the first, everyone who receives CSD **will also receive** CSD/2. The exception; those outside of the United States will still be able to subscribe to CSD alone and will in fact have to subscribe to CSD/2 and CSD together if they wish both. Some of the CSDs going overseas cost us as much as \$7 a copy in postage! For new subscriptions, and renewals, the rates

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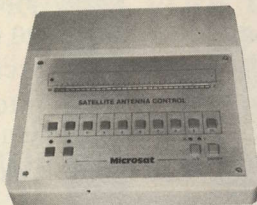
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will be as follows for the United States: CSD plus CSD/2 will be \$65 per year with CSD mailed first class (airmail) and CSD/2 mailed by a somewhat slower class of mail. For both sent via first class (airmail), \$75 a year. CSD/2 will also continue to be sent to the SPACE Dealer Members, without charge, as our contribution to the SPACE dealer program.

CSD/2 will be smaller than CSD, at least in the beginning. It happens that I finally took the 'computer plunge' at about the same time as this came up. It also happens that after four years of struggling with telephone circuits that worked less than 10% of the time, and then badly, we finally have reasonably good quality telephone service in the Turks and Caicos Islands. A new Grade B Intelsat terminal, coupled to a new microwave inter-island network, gives us telephones that are at least 1970ish technical level. This now means that I can modem to modem bits and bytes from my Providenciales office to Fort Lauderdale. Magazine copy, this magazine copy, for example can be prepared on a word processor, stored to disk, and then dumped directly to our printer's typesetting equipment. The fact that it will travel 80 miles on terrestrial microwave, through an Intelsat B terminal to a satellite over the eastern Atlantic, back hauled west again to Maine and then coupled into the Bell network for hauling south all the way to Florida before it ends up at our printer is part of the magic of 1984 technology.

The ability to input magazine copy directly to the printer, not only from Providenciales but from anyplace in the world, greatly expands the scope of the publications. Knocking out days for the typewritten copy to travel by slow airplane and slow ground transportation tightens up the whole schedule. Even when I make the 4 hour flight myself to Florida, you will see me with a typewriter-like device on my lap banging away at magazine copy.

Our in-depth looks at various marketing trends, in CJR, seems like a good basic policy to follow. Dealers tell me they get real value from these frank discussions of marketing strategies. News about new products will also continue in CSD/2. But the most important quality of CSD/2 will be the quick turn around; the ability to 'lock it up' on the 12th and have it in your hands on the 16th or 17th. The first issue will be

available in Vegas at the CSD-CSD/2 booths. Look us up.

GROWTH Of SMATV

I read an interview recently given by the head of the Canadian cable television trade association. He stated that his association has 'identified' 398 SMATV systems in western Canada, alone. He suggests there may be over 1,000 spread throughout Canada. Our own look at this area, back in the **August CSD**, suggested a far larger number may be operating in the United States.

In Canada, as reported in our January issue, the high courts have ruled that SMATV, using satellite signals from the USA, is **not illegal** under Canadian law. Provided, the SMATV system does not make any kind of **charge** for the programming service. There appears to be a one to three year window here, from that court decision, during which those who wish to build new SMATV systems can do so without fear of running afoul of 'the law.'

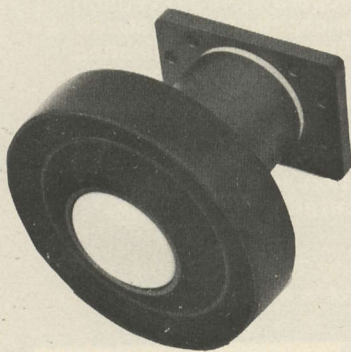
Canadian SMATV systems almost exclusively distribute **US satellite signals**. There is no marketplace mechanism in place that allows these SMATV operators to **contract** for those program services, so as long as there is no charge for the services, everyone kind of bungles along aware that ultimately things will change. In the meantime there is plenty of SMATV type equipment 'moving' and a relatively pleasant relationship between equipment providers and equipment users.

With encouraging signs that Showtime/The Movie Channel will now be dealing with SMATV systems, with ESPN, CNN and others already dealing with SMATV systems, the U.S. SMATV marketplace is also looking brighter.

What is really happening here is that hundreds of TVRO dealers are discovering that there is good money to be made by marketing and installing SMATV systems in their areas. Some of the systems are relatively small, barely larger than a home system (**example**: a fellow in Missouri is installing terminals at Baptist churches; he parks a dish on F4 and provides two channels from Trinity and NCN through perhaps a dozen to 15 outlets in the church 'complex'). Others wire whole retirement communities with up to 7 satellite delivered channels

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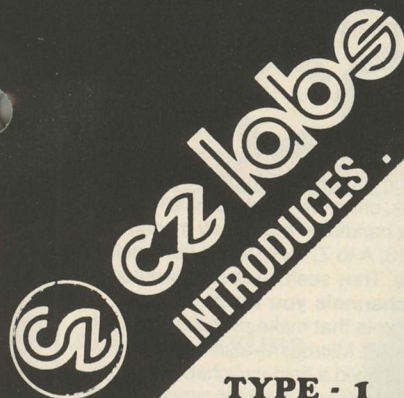
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3 COND. #22 SHIELDED W/DRAIN WIRE
3 COND. #20 SHIELDED W/DRAIN WIRE
3 COND. #18 SHIELDED
1-RG-59/U-20 GA.-60% BRAID
100% FOIL-/WITH TYPE 3
BLACK POLYETHYLENE JACKET
FOR DIRECT BURIAL

TYPE - 2

2 COND. #14
3 COND. #22 SHIELDED W/DRAIN WIRE
3 COND. #18 SHIELDED
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100% FOIL-/WITH TYPE 3
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330 FT. SPOOL @ 54¢ FT.
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5,000-10,000 FT. @ 44¢ FT.
10,000-50,000 FT. @ 42¢ FT.

COAXIAL CABLE

RG-6/U (FOIL & BRAID)	\$ 65/M'
RG-8/U (95% BRAID-FOAM)	\$210/M'
RG-59/U (96% BRAID-PE)	\$ 89/M'
RG-59/U (75% BRAID-FOAM)	\$ 65/M'
RG-59/U (FOIL & BRAID)	\$ 49/M'
RG-59/U DUAL (FOIL & BRAID)	\$105/M'
RG-11/U (96% BRAID-PE)	\$210/M'
RG-213/U (96% BRAID-PE)	\$240/M'
RG-214/U (TINN. COPPER BRAIDS)	\$550/M'
RG-214/U (SILVER BRAIDS)	\$1300/M'
RG-217/U (96% BRAIDS-PE)	\$600/M'

TYPE 'N' CONNECTORS

UG-21/BU (MALE)	\$2.25/each
UG-21/DU (MALE)	\$2.00/each
UG-57/BU (DOUBLE MALE)	\$3.10/each
UG-29/BU (DOUBLE FEMALE)	\$3.10/each
UG-27/CU (RIGHT ANGLE)	\$4.45/each
UG-23/BU (FEMALE)	\$3.00/each
UG-58/AU (CHASSIS)	\$1.60/each
'N' CRIMP MALE	\$2.10/each

MULTI CONDUCTOR CABLE

2 COND. #20 SHIELDED	\$ 65/M'
2 COND. #18 SHIELDED	\$ 79/M'
3 COND. #22 SHIELDED	\$ 75/M'
3 COND. #18 SHIELDED	\$105/M'
2 COND. #16	\$ 80/M'
2 COND. #18	\$ 49/M'
2 COND. #20	\$ 39/M'
3 COND. #22	\$ 40/M'
3 COND. #18	\$ 79/M'
4 COND. #22	\$ 49/M'
4 COND. #20	\$ 69/M'
6 COND. #18	\$135/M'
8 COND. (2-18/6-22)	\$129/M'
8 COND. (2-16/6-18)	\$230/M'

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F-59 W/1/4" RING	9¢ each or 69/M
F-59A ATTACH.	10¢ each or 78/M
F-59 ALM LONG ATT.	11¢ each or 99/M

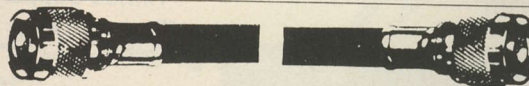
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8 Feet	\$ 9.25	\$ 8.75	\$ 8.25	\$ 7.75
10 Feet	\$ 9.50	\$ 8.85	\$ 8.50	\$ 7.95
12 Feet	\$ 9.85	\$ 9.35	\$ 8.85	\$ 8.35
15 Feet	\$10.50	\$ 9.95	\$ 9.50	\$ 9.00
20 Feet	\$11.75	\$11.50	\$11.00	\$10.75

— ALL LENGTHS AVAILABLE —

plus perhaps four or five off-air terrestrial services.

CJR-CSD/2 began looking at the CATV/SMATV 'jungle' in December. Dealing with the regulatory and financial pitfalls of the business, it continues that overview in our March and April issues. CSD began its look at the **technical aspects** of SMATV in February, and we continue that this month. There are many, many dangers in this business. Both legal, and technical. And the financial aspects of SMATV are 'awesome.' You can lose a great deal of money here, overnight. You might also make some money, but the odds are against it if you intend to 'get rich' by **owning the system** and collecting payments each month from the users.

One of the aspects of SMATV which seems to have been overlooked by many, even today, is the hardware. Because SMATV uses the cable and satellite technology bases, there is hardware from both industries in use. Until recently, you went to a satellite distributor for the satellite hardware and to a cable distributor for the cable hardware. Some of the cable distributors are 'reps' for various satellite systems (BT reps for Scientific Atlanta, for example) but other than Patmar which began as a satellite hardware distributor, nobody in the satellite end seems to have a **full handle** on the cable products.

If I were looking for a **business opportunity** today, I think I would focus on putting together a really first class distribution business that concentrated on the unique needs of the SMATV system builder. Dishes in the 10 to 16 foot class, multi-beam feeds, high grade satellite receivers, power control systems such as the Sola, Bud racks, headend combining networks, off-air processing systems to mix off air and satellite signals, 412 and 500 cable with fittings and tools, taps and so on. I'd offer off the shelf delivery on everything a SMATV designer needs, and I'd offer to pre-package headend racks on a custom basis so I could sell and ship to a guy a complete headend ready to turn on.

As a heavy user of modulators over the years, I have been always uneasy with the modulator end of the business. Let's say you need 8 modulators for a headend. You go to a BT or Jerrold distributor and you give them your list of channels. They never (well, almost never) have the full list of channels in stock. So they send me 5 of the 8 and

back order me for the rest.

Now, it turns out that BT (and Jerrold and most of the other modulator makers) seem to produce modulators in channel groups. They make channel 2 units this week, channel 7 next week, and so on. It is apparently very difficult to get a handle on how many modulators for the various channels from 2 to 13, A to Z, there are in the pipeline nationwide at any given point in time. They seem to always be short of a few channels, **no matter what channels you want.**

There are two firms out in California that make modulators which you can dial up to any channel you wish. Microdyne also makes one of these. The problem is that when you build a field-switchable modulator, you have to keep a bunch of 'bandpass filters' in stock so that when you change the dial from channel 2 to channel 8, you also run around the back of the unit and change the 'filter' at the output from 2 to 8. So even though you have front panel changeable channels, you have rear of unit bandpass filter modules to swap out. The front panel changing is a great concept; the rear of panel filter changeout puts you almost back where you started.

I have always felt the **ideal modulator** would have **no filters** to change, and it would let you dial up any common channel for at least 2-13 and perhaps if you were lucky it would also include the mid-band channels from say A to G. Alas, nobody seemed able to do it. Or if they did it, the price was in the several thousand dollar class.

It is with great interest that I see **Doug Dehnert's USS** planning to introduce at the Vegas show season later this month a new **Maspro** modulator that does exactly this. It gives you full channel agility and there are only three filters; one for channels 2-6, another for channels 7-13 and a third for the mid-band channels.

Now the truth is that once you install a modulator, you seldom run out and change its output channel. But, the distributor who handles products still has the inventory-balance problem; keeping, in stock, the required depth on each of the channels. The fact that you, as a user, will probably never change the channel in the field, does not make life any easier for the distributor who has every channel in stock **but the channel you need.**

I fully expected the Maspro product to be a winner, when we saw

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- Drain Wire

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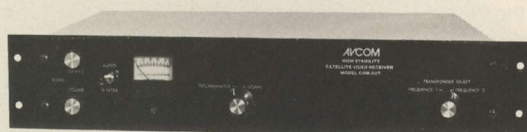


COM-2B



SCPC-100

AVCOM's SCPC-100 allows reception of single channel per carrier transmissions from international and domestic satellites. Audio channels not sent with video information can be received. Features external or internal downconverter.



COM-20T

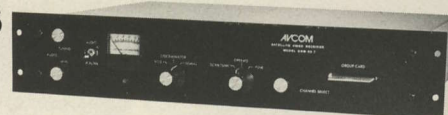
AVCOM's COM-20T High Stability Satellite Video Receiver is the answer to your need for a highly stable and reliable receiver for cable, private cable, radio stations, TV stations, BIZNET, News, Weather & Music Services, and other dedicated applications. The COM-20T can be factory or field adjusted to a particular transponder and will

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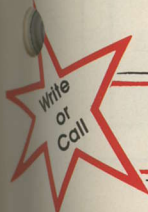
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the modeling of it in Nagoya, Japan this past November. However, when the tentative pricing schedule for it was set in January, I **knew** that it would be a world beater. I won't give away USS's surprise here, but I will suggest that if you can afford one of the 'old fashioned' single channel modulator packages from BT or Jerrold, **now you can have** a modulator that works on virtually any channel, in the same price range. I hope USS has a big, fat order book with them in Vegas; they are going to need it!

THE Pre-Packaged Home System

When I put together my first TVRO system in 1976/7, I went to Microdyne for a receiver, to U.S. Tower for an antenna, to SCI for an LNA and then using my 25 years of ham radio experience I patched together the special cables, the modulator, the power supplies (LNAs were powered through a **separate line** in those days; no powering up the coax line!) and a baseband monitor. When later in 1977 I installed the first home ten foot dish system (the first system used a 20 foot antenna) it took me four months to round up all of the parts. The dish was a Prodelin, the mount came out of an army surplus yard, and so on.

Being a dealer, even as late as 1981, was a giant pain in the neck. The original folks at **National Microtech** changed much of this, making it possible for a dealer to get everything he needed from a single source. Others of course followed so that by 1982 you could open one or two cartons and unpack virtually everything you needed to get a TVRO system in and operational.

Sensing a good thing, some of the OEM's then began to package entire systems in a single carton or two at the **manufacturing** plant level. Conifer was one of the first to 'refine' this technique and now as we head for Las Vegas we can anticipate that more and more of the OEMs will be doing the same thing. The battle of pre-packaged systems is here.

When you had to spend countless days on the telephone and writing letters to round up the parts for a single system, the dealer almost had to be a combination auto mechanic and electronics jockey. What didn't fit you modified and what didn't plug together you re-wired.

Even when National Microtech was sending you everything you needed in a set of cartons, you still had the problem of making the various parts go together. Since they were not designed to any 'compatibility standards' you seldom had the luxury of finding cables that plugged from one brand unit to another brand unit, or mounts that perfectly fit the dish or held the LNA plus feed in the proper position. You had everything you needed, but the format was seldom compatible.

As the Conifer-approach has caught on, it has become possible for a dealer to be successful without being a mechanic and an electronics jock. If you can follow a diagram, if you can read labels on ends of cables, you can complete system wiring and handle the mechanical assembly. This has allowed people who distribute swimming pools and vacuum cleaners to become TVRO dealers. Expertise, technical expertise, is no longer essential to being a successful dealer.

There are pros, and cons, to this. As installations have become uncomplicated, the dealer could get by without even understanding the geo-stationary orbit belt. That means more people can be dealers since they don't have to have technical expertise to succeed. The downside of that is such a dealer is ill-equipped to sort out a problem **when something does not work** as it is supposed to work. So while the average dealer needs no technical expertise in the 'typical' installation, anymore, he still needs some sort of **technical backup** when he finds himself facing a system that does not play.

I had a guest on Provo recently with a new antenna. We were testing the antenna and making suggestions on how the antenna would be more appealing to the non-technical breed of dealer. The dish had a .3 f/D feed and you maximized the dish gain by carefully monitoring a signal level meter as you slid the feed in and out from the center of the hub.

"Why don't you scribe a mark on the feed support tube," we suggested, "where the feed is **supposed to rest** when the dish is assembled? Why put the dealer through this slide it in / slide it out routine at all? Just tell him to slide it up to the scribed mark and tighten down the bolts!"

The response.

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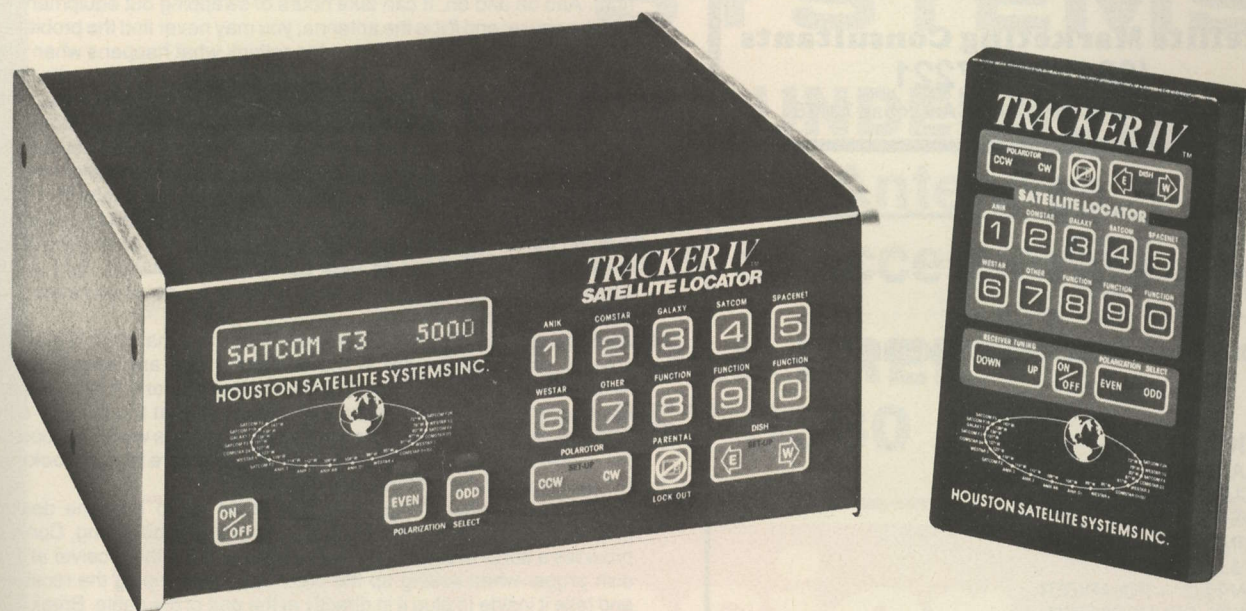


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We've always prided ourselves on the quality of the brands we carry, from every standpoint — reliability, technical design, and user acceptability. We've been particularly careful in the selection of antenna positioners and have selected the very best — HOUSTON SATELLITE, LUXOR & MTI.

We feel, however, that in this particular instance, we should point out that we're **very** impressed! The Houston Satellite System Tracker IV with UHF wireless remote control and the capability of flexible receiver interfacing is the most advanced antenna positioner we've seen and probably are likely to see for some time.

Our congratulations to Mike and his group at Houston Satellite Systems for a job well done!



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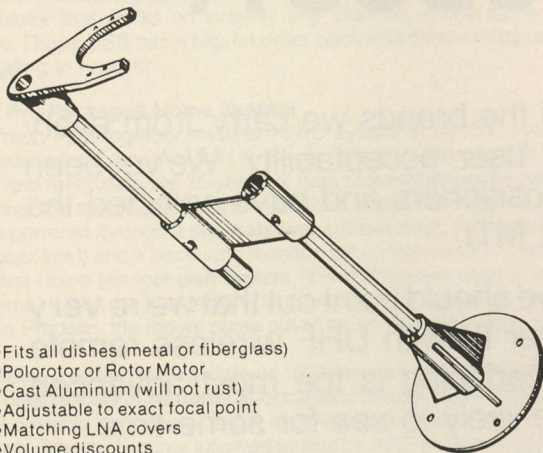


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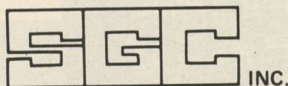


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"Maybe the gain is best at **some place other than** where the feed is supposed to be. Maybe he didn't assemble the antenna properly and the focal length is closer to, or further from the dish than 47 inches. He needs to find the best performance, always."

A valid point. However, if the antenna is not assembled properly, then you will not get maximum performance. I would rather see the installer **aware that he made a mistake** than to let him assemble the dish, peak the feed for maximum signal and walk away **thinking he had done it right**.

"Let's compromise," I suggested. "Scribe the mark at 47 inches (actually 46.8 inches) and tell the installer that's where he sets it. Then let him go either side of the scribe mark to see if the signal falls off. If it falls off, in both directions, he knows he assembled the antenna correctly. If it goes up in one direction, the dish is too flat; if it goes up in the other direction, the dish is too deep. If it goes up in both, he has a warped surface!"

A self proofing dish. If you design a dish a certain way, you know that it will work in a certain way. If it works **any other way**, there has been a mistake between the design and the assembly. **The dealer needs to know this, so he can correct his mistake.** The position of the feed, when you are done with assembly and have maximized signal, tells you everything about the dish's performance.

How many times have you assembled a dish, one you are familiar with, and found the results less than you expected? I have many times. **So where do you begin to look for the problem?** Is it the dish surface? Maybe the feed is not properly centered. Maybe the LNA is below its specifications. Maybe you have a bad connector on the 213/214 cable to the down converter. Maybe the down converter is not right. And on and on. It can take hours of swapping out equipment to find the cause; and if it is the antenna, you may never find the problem.

People designing dishes need to rethink what happens when the feed is installed and connected to the electronics. The feed's final location, where the signal is peaked, is a message. That message tells you everything you need to know to verify that the dish is properly functioning. So why not take this elaborate message, boil it down to its most basic bottom line, and use that data to inform the installer what is right, or wrong, with the dish **after assembly is completed?** A few scribed marks, on the feed support, whether the support is a pipe up through the center of the dish (Paraclipse, et al) or a strut-supported feed (ADM, et al) would be very useful to the installer. He'd know where to start looking for problems, whether he could eliminate the dish as a possible problem.

The art of pre-packing systems involves more than simply making sure all of the cables are in the container, that any special tools required are there, that everything fits together properly. It should **also** involve enough common sense instructions so that the installer can either prove to his own satisfaction that the system is working properly (i.e. a built-in set of proofing guides), or, **know where to start looking for problems** if the pictures are not good.

There are other things the OEM could do to help the dealer troubleshoot, or verify, that his system is properly operating. Conifer provides a set of break-out cables so you can stick the receiver at the dish proper when setting up the dish. Then you unplug the receiver and take it inside to plug it in directly at the end of the cable. Break out cables, at the dish, are a great idea. They eliminate having to make up short jumpers to check the system out, and they pre-test the actual wiring that goes with the system.

I'd like to see a couple of small LED (light emitting diodes) installed in the outdoor/down converter boxes, as well. If there is an AC voltage to drive the drive, it would be nice to know you have AC operational without hassling around with a meter. A small red LED that automatically came on when AC was available would be nice. Then to verify that you have +23 (or whatever) volts DC available for your LNA and down converter, a small green LED on the down converter box would be nice. Plug it all in, both lights come on; you know you have power. No meters, no fuss.

Some drives still run on 117 VAC(*). While I am not generally in favor of this practice, if you do end up with 117 VAC out at the dish to

*Many local electrical laws have special requirements concerning running 117 VAC outdoors. Dealers should always check on the electrical code requirements **before** installing AC to a dish!



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run the drive, why not go ahead and build a single AC outlet into the down converter / drive box so that an installer can plug in his 1/4 or 3/8 inch drill. No more long extension cords; you run the total control cable bundle first and then after wiring it all up, you plug in your drill and go to work on your dish using that AC outlet. It would also give you a place to plug in the receiver proper and monitor for checking the dish.

Down converter boxes, mounted usually on the dish stand, are often not properly planned. Generally speaking, they are not large enough. It takes a great deal of careful work to get a down converter of modest size into the box, and then when you do, you have to drill holes in the box to mount the down converter to the side of the box. Many people just 'stuff' the down converters into the box and let the 213/214 cable support it, more or less, in place. Not good. With a little better planning, the down converter housings at the dish could be the **right size** and **right shape** to allow room for the installer to mount two separate down converters for those installations that require this; without having the cables run into each other. You can't bend 213/214 cable sharply and it shouldn't be necessary to 'force' these cables into place.

Pre-packing is here. Now what remains is for pre-packaging to be 'smart pre-packaging'; mindful of the real world the dealers operate in, and conscious of providing the installer with some convenient 'tools' to make trouble shooting of system faults quicker and more certain. A few LEDs, some carefully calculated scribe marks, better access to important voltages and controls would be big improvements for the dealers.

THE GALAXY One Tests

When HBO first brought up its east coast feed on **TR1 of Galaxy** in January, my heart did a flip. The picture quality stunk in the Caribbean, while the folks on SIN and Galavision were 100% plus just a few transponders away. I quickly let HBO know about what I was seeing.

In a few days HBO was up on 23 while Cinemax was up on 19. The pictures were **now as good** as SIN and Galavision. C-SPAN still didn't look that hot, and CNN had just a few sparklies in it, but overall things were improving.

What we seem to be seeing with Galaxy is a **decided signal difference** between the vertical transponders (the even numbered channels since it is like Westar) and the odd numbered horizontal channels. **Franklin B. deCastro** on the Dutch island of **Curacao** in the southern end of the Caribbean reports the same thing; signals on 1 (HBO), 7 (CNN), 11 (CBN), 13 (C-SPAN) and 21 (HBO Linkabit) are down below the sparklie threshold on a 20 foot ADM dish, with a look elevation of 13 degrees. On the other hand, SIN (6), CNN2 (8), TMC (14) and Galavision (20) are all broadcast level (no sparklies), or better.

We had reported that transponder 13 (C-SPAN) was dead. It is. You may be wondering how a 'dead transponder' can be pumping out C-SPAN. Each transponder has its own 'final output power stage.' The output power stage for TR13 had a premature failure. That put this transponder out of service. However, there is a backup power amplifier on board, for each set of 6 transponders. There are 4 backups for 24 channels. So Galaxy has electronically switched the one backup amplifier for transponders 1, 5, 9, 13, 17 and 21 into position so it now is operating for TR13. That means we no longer have a backup for the **other** transponders in that set of six. If another transponder in that set should fail, down the road, chances are C-SPAN will get 'yanked' off the bird, or at least off of transponder 13, while the 'spare' final output power stage is electronically re-routed to cover for the second failure in that set.

As we reported in **CSD** last month, there is a 'SRO' (standing room only) sign out at Galaxy 1 these days; all of the available transponders have been sold with CBN being the last to come on board on **their own** transponder. With WTBS and WOR both holding transponders, we now have two of the important three 'indie signals' on one bird; just like F3R, although over there it is WTBS and WGN. I am told by usually reliable sources that WGN's carrier, United Video, is trying to get a 'second hand berth' on Galaxy 2 so that all three of the indies will be on the same bird. Years ago, on F1, we had that package available and it certainly made life easier.

There are plenty of musical chair games going on with Galaxy 1 at the present time. Some of this activity is because many of the suppliers expect Galaxy 1 to be around for several years after F3R runs



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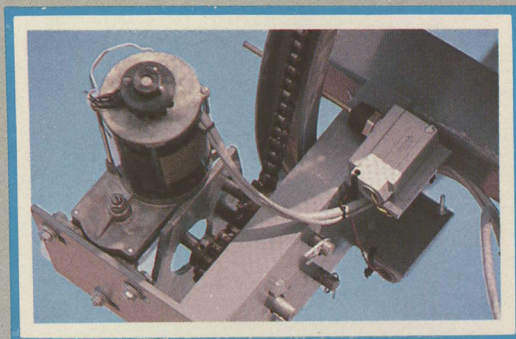
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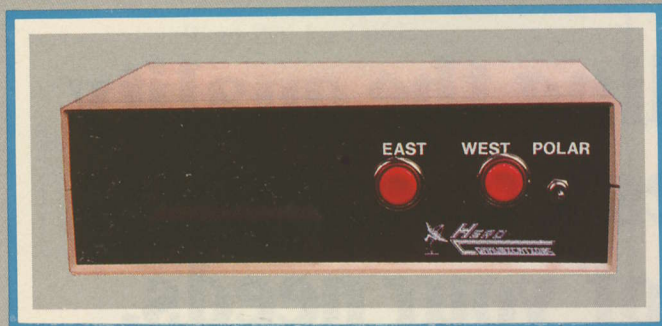


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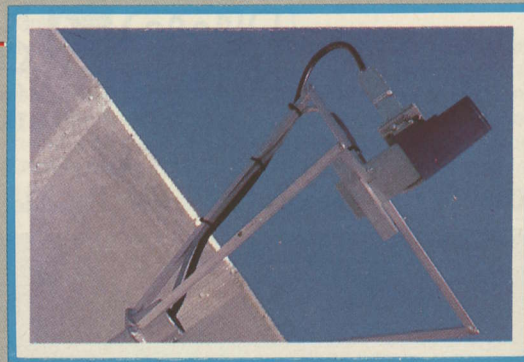


A.



B.

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out of poop. We reported last month that losses in signal level on F3R this past year have been at or greater than expected levels; the bird is dying a little bit every day. There are also now rumors running loose that RCA is having some premature problems with F3R; problems which could spell a loss of perhaps six total transponders sooner than later.

Repeating the rumors, which RCA sources totally dismiss, will only serve to spread unsubstantiated stories. So I'll rely on my own sense of history to put it all into perspective.

F2 was the first cable bird. It had problems; big problems. The solar array that catches the sun's rays to turn into electricity to operate the bird would not rotate or track the sun automatically on its own. Every single day of its life, F2 had to be manually operated for a part of the day; the solar fans sticking out to the side had to be driven backwards in a 30 minute or so daily activity to avoid allowing the solar array to turn past an area in the normal 360 degree circular rotation where the solar array was in danger of 'hanging up.' RCA feared that it might get to that 'dead spot' and stop altogether. If that ever happened, the bird would wither and die in a matter of days since without power from the sun full time, everything inside quits operating. F2 also had an erratic control function; on more than one occasion the bird took off and turned away from the earth, seemingly on its own. When it did this, RCA had several very traumatic hours trying to get its attention, and commanding it to turn back around towards earth again. They almost lost it, pointing out into space.

F1, on the other hand, left the pad minus one and perhaps two of its operating transponders. They, like TR13 on G1, simply failed. Perhaps the stress of launch got to it; perhaps it was defective to begin with. Whatever the case, it was not a 'whole bird' at any time it occupied 135 west.

RCA's F2R, over in the eastern sky at 72 west, has some sort of 'heat buildup' problem. RCA calls F2R an 'in orbit spare' meaning that it is just sort of 'standing by' waiting to be called on for replacement duty service. It may be needed sooner than they would hope since **F1R** at 139 west has had some erratic operating habits even though it is a new bird.

The stories now making the rounds relating to F3R have to do with the yet-unexplained down-signal levels found on transponders 2, 6, 10, 14, 18 and 22; on F3R. Problems with **this transponder set**, attributed to a section of waveguide, are much discussed by people who are probably only partially tuned in to the 'real story.' RCA, wisely, is ignoring all of this.

The cable industry, however, has been through the problems of the past and they have 'nervous tummys' whenever transponder or satellite failure is brought up. So many dollars are riding on the whole reliability factor of the satellites, they worry alot when they start hearing stories such as this. So the smart ones have decided they had better 'cover their bets' by sticking some of their excess profits into the rental or ownership of another transponder or two, 'just in case.'

Galaxy 1 is the 'just in case' bird in many of their minds. That it is 1 or more dBs stronger than F3R in many areas, at least on the now proven even-numbered horizontal transponders, is an added plus. That means there is that much more signal degradation 'protection' built into G1 before the dish systems using the G1 feed start having problems. In addition to that, Hughes generally speaking has a slightly better long-term performance record with their birds than does RCA. A betting man would give a Hughes bird longer to perform than he would an RCA bird; all factors being equal.

What remains unresolved for now is the actual operating status of the G1 odd-numbered, horizontally polarized, transponders. Is it just a coincidence that those that are now fired up seem to be down from 1 to 3 dB? Is it a fault of the uplink operators, or is it a problem with the bird? If it turns out that Galaxy 1 does have some sort of real problem with some (6) or all (12) of the horizontal transponders, the 'game plan' for HBO's 'CBD DBS' at 4 GHz will suffer. All of those great claims for 'strong pictures on 4 or 6 foot dishes' will be thrown into a cocked hat if we have 3 dB or so differences between the vertical and horizontal transponders.

As you do your own inspection of the G1 signals, as the bird continues to 'load up' over the next 30 to 60 days, we would appreciate hearing from you. Getting a handle on the scope of this problem (if there is a problem) will be important to all of us in the 'CBD era' ahead.

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